Products finishing

FRED W. VOGEL, Editor

Volume 4 | JULY, 1940 | Number 10

Published monthly by Gardner Publications, Inc. 431 Main St. Cincinnati, Ohio

•

DON G. GARDNER
President and General Manager

•

JOHN M. KRINGS
Advertising Manager

GEORGE E. HAY
431 Main St., Cincinnati
Main 0182

G. M. FILLMORE
ROBERT E. AHRENSDORF
342 Madison Ave.
New York
Murray Hill 6-3899

GEORGE H. MEYERS
Tribune Tower, Chicago
Superior 2290

Member

CCA

Printed in U. S. A.

Copyrighted

CONTENTS

Surface Finishing Castings 9
By C. C. HERMANN

Metal Coloring Theory and Practice—Part VII 14
By JOSEPH B. KUSHNER

Finishing Containers at Allis-Chalmers Plant 24

Highpoints of A. E. S. Convention Papers 28

Barrel Finishing of Metal Products 38
By H. LEROY BEAVER

Extinguishing Paint Fires Automatically 46
By P. W. EBERHARDT

A. E. S. Exhibits 50

The Finishing Forum

Painted Porcelain Enamel on Iron 52
By BERNARD H. PORTER

News of the Industry 56

New Plant Equipment and Materials 62

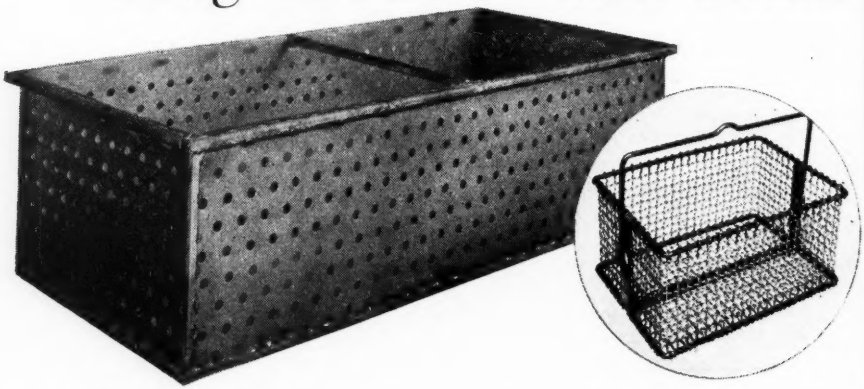
Opportunity Section 77

For Your Catalog Library 78

Index to Advertisements 80

More Than 15,000 Circulation This Issue

NO LIMIT *in Design* *using* MONEL *Mill Forms*



Made by Carpenter Metal Products Co. of Cleveland, from perforated Monel sheet. this large basket is 72″ long, 36″ wide, 24″ deep. Note use of bar stock for bracing corners and rim, also supporting rail which permits handling by crane. Welded Monel construction throughout assures adequate strength without excess weight.

Used for pickling 200 lbs. of material in hot sulfuric acid, this wire mesh basket is 24″ long, 18″ wide, 12″ deep. Made from .160″ dia. Monel wire, ½″ Monel rod for handle and frame, with ⅜″x1¾″ Monel flats along bottoms and ends, it weighs only 43 lbs. Built by Cambridge Wire Cloth Co., Cambridge, Maryland.

This cylindrical basket is designed for handling very small parts. Made from Monel sheet, with 3/32″ perforations, strongly braced and arc-welded, it is 12″ diameter, 12″ high, equipped with swing handle. Fabricated by Carpenter Metal Products Co. of Cleveland.

• • •

THERE is practically no limit to the variety of designs possible in pickling baskets...when you use welded Monel construction. With a wide range of mill forms to choose from, all readily fabricated and welded, experienced fabricators can turn out strong, lightweight welded Monel equipment that is good for years of service. Write for further information on Monel pickling equipment. Address:

THE INTERNATIONAL NICKEL COMPANY, INC., 67 WALL ST., NEW YORK, N. Y.

Monel

"Monel" is a registered trade-mark of The International Nickel Company, Inc., which is applied to a nickel alloy containing approximately two-thirds nickel and one-third copper.

PRODUCTS finishing

CINCINNATI, OHIO VOL. 4, NO. 10

JULY, 1940

SURFACE FINISHING OF CASTINGS

As told to C. C. HERMANN by MR. GEO. F. LIENER
Superintendent of Foundry, Pennsylvania Lawn Mower Works

THE Pennsylvania Lawn Mower Works, located at Primos, Pennsylvania, is one of the oldest and largest concerns of its kind in the United States. In this modern plant more than 125,000 hand mowers, 750 fairway units and a large number of power mowers are produced each year. Production schedules are spread over the year to provide year around employment to as many workers as possible although the principal outlet for the product is during the summer months and particularly during the early spring.

Some of the principal requirements of a good lawn mower are rugged construction, ease of operation, low maintenance cost, simple adjustments and low first cost. These and other requirements are fully met in the Pennsylvania mower. The larger portion, by weight, of the mower is cast iron and such elements as wheels and side frames must be made light as possible commensurate with strength. The low selling price of the finished product precludes the possibility of machining surfaces for the purpose

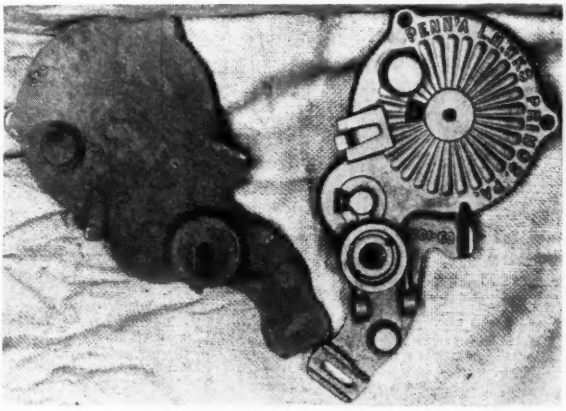


Fig. 1—Illustration showing mower side frame castings before and after tumbling.

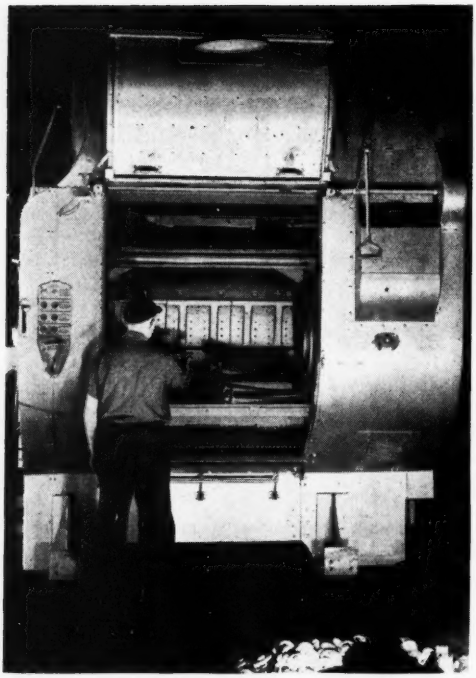


Fig. 2 — A Roto-blast unit designed specifically for cleaning castings after molding. The surface is smooth enough to receive a finish coating of paint or enamel.

•

of obtaining a high grade finish, consequently machinery which would provide a smooth finish of the cast surfaces without resorting to machining was selected.

Cast surfaces are capable of retaining a gloss paint surface only when the surface has been thoroughly cleaned. In the Pennsylvania Lawn Mower Works, according to Mr. Liener, considerable attention has been paid this phase of finishing. In the foundry, where the molds are made and the iron is poured, considerable can be done to obtain a smooth surfaced casting. Patterns are made with the utmost care to eliminate useless pockets. Partings are made with ample attention to the elimination of fins. Edges are rounded for appearance sake and lettering is maintained sharp and clear.

These features are better understood by observing the casting shown in the illustration Fig. 1, which shows the side frame for the hand mower. One casting is shown as it comes from the mold after the shake out and the adjacent casting shows the surface condition after cleaning in the Rotoblast barrel shown in Fig. 2. In Fig. 3 is shown another frame part before and after cleaning in the same manner and in Fig. 4 is shown two wheels and two gears, one of which has been cleaned, the other as it came from the mold.

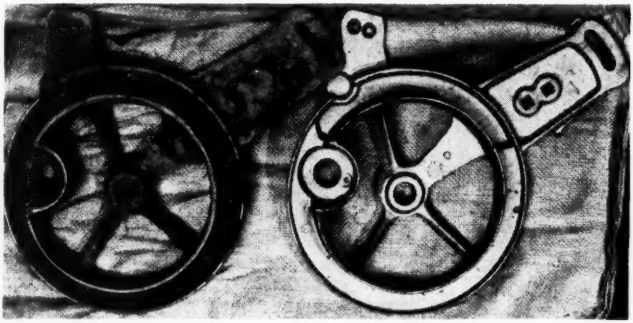


Fig. 3 — Illustration showing gear housing castings before and after cleaning.

SH-H-H! He's found a hidden gold mine!

A NEW gold mine of SAVINGS has just been discovered in metal pre-cleaning! In one plant, costs have been reduced one-half, in another by two-thirds! These savings are in *dollars*, not in pennies. If you want a special job done thoroughly, swiftly and *cheaply* don't write, *wire* The J. B. Ford Sales Co., Wyandotte, Mich., for details of this new pre-cleaning method!

Wyandotte

SERVICE REPRESENTATIVES IN 88 CITIES

THE J·B·FORD SALES CO· WYANDOTTE MICH·

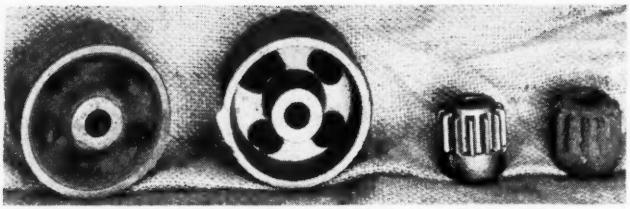


Fig. 4 — Wheels and gears such as these show that small, intricately formed pieces can be cleaned as thoroughly as large flat pieces in the tumbling barrel.

It is obvious from these examples of the work in this plant that much can be done in the cleaning of the surface to insure proper finish of the completed product. Of outstanding importance is the complete cleaning of the deep places in the castings and particularly around the corners, as for instance, in the side frame part shown in Figs. 3 and 4. If such points are not thoroughly cleaned of all sand, the paint will be dull and the surface rough.

Mr. Liener says that, due to the thin sections used in casting lawn mower parts considerable trouble is often experienced due to breakage during the cleaning operation. In fact, they formerly suffered a loss of as high as 30 per cent in the ordinary mill. This loss was cut to 10 per cent by rubber lining the mill with one inch of rubber and later reduced to 5 per cent by the purchase of the unit shown in Fig. 2. He says that he puts 80 wheels, such as shown in Fig. 4 and 70 side plates such as shown in Fig. 1, in the mill, operates the mill for a period of time ranging from 12 to 15 minutes and removes them thoroughly cleaned. The mill takes 1,200 of the pinions shown in Fig. 4 and turns them out clean in 20 minutes. It requires 7 minutes to clean a mill load of 150 mower wheels.

From the foregoing it is seen that cleaning can be made a relative simple and inexpensive matter, that is, a degree of cleaning which is necessary if the final finish is to be complimentary to the product.

Du Pont Technical Service Manual. Application of the "Hull and Strausser" test of electrodeposit thickness to zinc, cadmium, tin and copper is described in a new technical service manual issued by the Du Pont Company, Wilmington, Delaware.

The method of rapid determination is classified as a dropping test. It is the work of R. O. Hull, of Du Pont, and P. W. C. Strausser, research associate of the American Electro-Platers' Society at the U. S. Bureau of Standards.

The Hull-Strausser test is termed particularly application to cadmium and zinc electrodeposited coatings, and is now included in several Federal specifications. It was adopted recently for electro-tinned coatings, and has been found a practical and rapid method of determining deposit thickness of the new Du Pont high speed copper.

Principle of the method is simple and can be employed with ordinary laboratory equipment, easily assembled or obtained complete. It is based on the fact that a coating is attacked by a chemical reagent at a constant rate if the reagent is applied to the surface in successive drops. Variations in the strength of solution are avoided by the use of fresh reagent of constant strength, constantly applied to the surface under test.

The bulletin gives directions for operation and the recommended solutions for best results.

Copy free upon request.

Mention PRODUCTS FINISHING when writing to advertisers. Your cooperation will be appreciated both by the advertiser and this magazine.

All in the same simple operation

1. FRICTION REDUCTION—*Pentrated* tools (such as taps, dies, bits, saws, knives, etc.), bearings or moving surfaces actually show 30% to 80% less friction. Purchasing agents insist on *Pentrated* surfaces for longer wear and less replacement.

2. RUST RESISTANT—*This beautiful black finish* "stands up" longer on steel parts or tools in use or in stock.

3. AIDS LUBRICATION — *Pentrate* imparts a valuable aid to steel cutting tools or machine parts that must be oiled. Try it—notice how the lubricant stays in place.

Plus *A beautiful black finish with no increase in size of parts treated*

HEATBATH CORPORATION

SPRINGFIELD - - - - - - MASSACHUSETTS

*Demonstration samples processed gratis.

METAL COLORING THEORY AND PRACTICE—PART 7

By Joseph B. Kushner, Ch.E.
Electroplating Consultant

CADMIUM and zinc are metals that are not very often plated for decorative purposes. They are soft, bluish white metals and even though they can be polished to a very high luster, they lack the brilliance and attractiveness of polished silver, nickel, or chromium. Furthermore, after polishing, they will gradually assume a smoky appearance, if subjected to moist atmospheres, unless they are protected by a film of lacquer or oil. Yet they can be colored to produce several interesting effects, and cadmium, specifically, can be finished to simulate old iron, pewter, and oxidized silver. The apparent neglect of more extensive coloring of cadmium and zinc has been due to the wide use and adaptability of these metals for protection of iron and steel.

Joseph B. Kushner

Cadmium and zinc are the best protective finishes we have for the ferrous metals inasmuch as they corrode preferentially or "sacrificially" in the presence of iron or steel. This is easily understandable when we consider the relative positions of cadmium and zinc in the electromotive series. A diagrammatic sketch showing the arrangement of the metals in the electromotive series is presented in Fig. 1.

The higher a metal is located in the series, the less stable it is, and the more rapidly does it tend to go into solution. If we have a deposit of zinc or cadmium on iron and expose the plated object to corrosive influences, the zinc or cadmium will be attacked and almost completely destroyed before the iron itself starts to rust. Cadmium, which is below zinc in the series, is a trifle less prone to chemical attack and is therefore a somewhat better protector for the ferrous metals in a number of applications.

Since cadmium and zinc make such excellent protective metals for iron and steel, little has been done about their decorative possibilities as metal finishes. It might be thought that even though the appearance of these metals is not especially pleasing to the eye, some one of their many compounds might produce a satisfactory color that could be used for decora-

tive as well as protective purposes. An examination of the compounds formed by cadmium and zinc shows that they are for the most part either (1) soluble, or (2) colorless and are therefore of no value to the metal colorer. Cadmium possesses a series of brownish oxides and a yellow orange sulfide. Zinc forms a pale yellow chromate. These are the only chemical possibilities for the direct chemical coloring of cadmium and zinc. Consequently, it would seem that the best methods for coloring zinc or cadmium would be by the precipitation of other metals and the compounds of other metals on the zinc or cadmium surfaces, either by chemical displacement or by electrodeposition. Copper, antimony, lead, arsenic, gold and platinum readily precipitate on zinc and cadmium by chemical displacement.

When deposited films of cadmium on zinc are porous, any attempt to color them, either by chemical precipitation or electrodeposition will permit corrosive agencies to seep through the pores, cause the formation of weak structured compounds under the colored films, undermining them and bringing about their rapid destruction. This is one of the main reasons it is difficult to coat zinc with a permanently adhering layer of paint.

There are, however, a few methods for coloring cadmium and zinc that produce fairly good, adherent finishes and these will now be described.

Coloring Cadmium

In recent years there has been a tendency, particularly in the lighting fixture and hardware fields, to imitate certain silver finishes by the use of cadmium. Cadmium itself cannot be used to duplicate polished silver for the reasons already mentioned, but certain of the oxidized silver finishes can be easily imitated by the use of oxidized cadmium. These cadmium finishes closely resemble such silver finishes as Stratford, Argentine, and Sheffield.

Imitation Oxidized Silver

In order to get artistic silver effects, the cadmium deposit must have a fairly substantial thickness. A thickness of approximately 0.0002 in. is recommended inasmuch as thinner coatings will not hold up in the powerful reagents used.

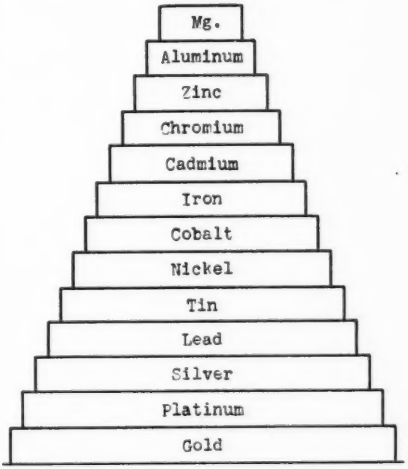


Fig. 1—A diagrammatic sketch showing the arrangement of metals in the electromotive series. The higher the metal is located in the arrangement, the less stable it is and the more easily it can become oxidized.

The clean, dry cadmium deposit is oxidized in the following bath:

Potassium dichromate.....	1 oz.
Nitric acid, 36 deg. be....	½ oz.
Water	1 gal.
Temperature	150 deg. F

Rinse the work thoroughly and dry in a good grade of sawdust or with

a centrifugal dryer. Relieve the highlights with a tripoli wheel using a minimum amount of tripoli. The excess composition on the work can be removed by tumbling through hard sawdust. This is the only feasible way for removing it since the colored oxide film would be destroyed by alkali cleaning. The color of the finish is a warm brown.

Sulfide Finishes

In actual practice, the color of cadmium sulfide, which is a beautiful yellowish orange, cannot be obtained by treatment of a cadmium surface with sulfides.

However, a serviceable brown hue can be obtained by dipping the cadmium plated object in a hot solution of concentrated sodium thioantimoniate (Schlipes Salt). Deeper browns with tints of red can be obtained by making up a paste of antimony pentasulfide and antimony sulfide with ammonium hydroxide, brushed on the work and permitted to dry. Rinse and repeat the operation again if necessary.

Black on Cadmium

For a fairly adherent black on cadmium, recourse can be had to the well-known "luster bath":

Lead acetate	⅛ - ¼ oz.
Sodium thiosulfate	12 oz.
Water	1 gallon
Temperature	200 deg. F.

Rinse thoroughly. Relieve highlights with a wire wheel and pumice. Rinse, dry, and lacquer. The finish resembles that of pewter.

A method for imitating pewter on French grayed silver which has been found to produce better and more uniform results is based upon a solution made up according to the following formula:

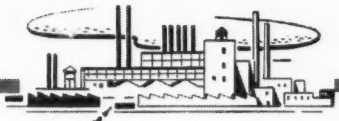
Copper sulfate	1½ oz.
Potassium chlorate	2½ oz.
Water	1 gal.
Temperature	180 deg. F.

The addition of approximately 2 to 3 oz. of common table salt seems to improve the adherence of the deposit, which is black in color. An immersion period of 2 to 10 seconds is generally sufficient. After rinsing thoroughly, wire brush with pumice to relieve the highlights, then rinse, dry, and lacquer. Occasionally, the addition of a few drops of sulfuric acid will help prevent the bloom on the treated surface because of the formation of basic salts in the coloring bath.

In connection with the above coloring bath it is interesting to consider the mechanism of the coloring reaction and point out something which is destined to become very important in metal coloring. The reaction that occurs in the coloring bath is a combination of chemical displacement and oxidation. First we have the displacement of the copper from its salt by the cadmium: $Cd + CuSO_4 = CdSO_4 + Cu$ precipitated. The precipitated copper now passes through a series of oxidation reactions because of the presence of the free oxygen from the chlorate and we get $2Cut + \frac{1}{2}0_2 = Cu_20$ (red-brown cuprous oxide $Cu_20 + \frac{1}{2}0_2 = 2Cu0$ (black cupric oxide). In the more modern shorthand of electron chemistry, the whole series of reactions could be expressed as:

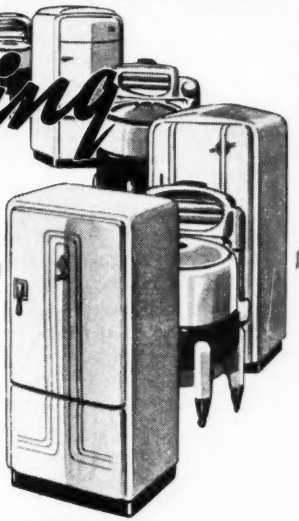
$$Cu^{++} \overset{+2e}{=} Cu \overset{-e}{=} Cu^{+} \overset{-e}{=} Cu^{++}.$$

The vital reaction of this chain is the first one. If the copper is precipitated in dense and adherent form on the cadmium, the final brown or black copper oxide films will be adherent also. If the copper is precipitated in granular or mossy form, the final colored film will be worthless to



AMERICA'S GREATEST INDUSTRIES INSIST ON AMERICA'S GREATEST RUST PROOFING PROCESS

Bonderizing



In addition to outstanding beauty and mechanical perfection many of America's finest products carry the world's best protection against rust and finish failure.

With Bonderizing under lustrous lacquer or enamel, the finish is given long life resistance to inside humidity or outside weathering.

Bonderizing provides positive adhesion for the finish and effectively bars the penetration of moisture to the metal—rust is avoided and fine appearance is maintained.

Being used on practically all American cars, Bonderizing has spread to other industries and has become the No. 1 form of protection for scores of other products made of iron, steel or zinc.

PARKER RUST PROOF COMPANY

2172 E. Milwaukee Ave. • Detroit, Michigan

PROTECTED BY Bonderite FOR RUST RESISTANCE

THE MARK OF A BETTER PRODUCT

The Bonderite Label is finding its way into many industries. On Automobiles, Refrigerators, Washing Machines, electrical and architectural equipment, as well as many other products, it indicates a better finish and careful manufacturing in every detail.

Send for These Books

New Books describing recent improvements in Parker Processes are available to manufacturing executives. Send for your copies.

PARKER *Processes* **CONQUER RUST**

BONDERIZING • PARKERIZING

the colorer, since it will not adhere to the cadmium. The question is then: How can the copper be made to precipitate on the cadmium in adherent form? And the answer, which is going to receive more and more consideration from metal colorers as time goes on, is proper agitation.

It is a known fact that a piece of metal such as zinc or cadmium when dipped into a solution containing a salt of copper will receive a dense, fine grained and adherent deposit of copper if the piece is rapidly rotated. If the piece is not rotated the deposit of copper is rough grained and non-adherent. In actual practice, some metal colorers and platers make unconscious use of this principle. These platers rapidly swish the objects to be colored through the coloring bath for the duration of the chemical treatment and get nice results; others just hang the pieces up in the coloring bath or hold them stationary during the treatment and ultimately become the object of the boss's wrath when the finish fails to stand up because it is non-adherent. Why does rapid agitation improve the adherence of a precipitated metallic film? The fundamental reason seems to be that agitation of a metal in a solution of another metal lower in the electromotive series makes the agitated metal assume a more noble position in the series, and the tendency for the precipitation of the dissolved metal on the solid metal is lessened. This may sound like double talk but if we consider the diagram, it means this; the zinc by rapid rotation becomes more noble and its relative height is reduced to a lower, more stable plane, in the pyramid. As the zinc becomes more noble, the metal precipitated on it becomes finer grained and more adherent. A practical example of this can be found in the immersion gold coloring of brass. If a piece of brass is suspended in a hot gold solution without agitation, the gold deposit will appear reddish; if it is rapidly agitated the immersion gold deposit will take on a lighter yellow hue. The decrease in crystal size of the grains of deposited gold because of the agitation, makes the gold deposit seem brighter and lighter.

This writer believes that in the future metal coloring will be performed in tanks in which either the work or the solution will be extremely rapidly agitated by mechanical means with the production of denser, more adherent and uniformly colored metal finishes than have hitherto been believed possible.

Antique Effects

Cadmium can be given an antique color by treating in a bath composed of the following ingredients:

Ferric chloride	1½ oz.
Copper sulfate	¼ oz.
Hydrochloric acid	10 fl. oz.
Water	1 gal.
Temperature	180 deg.

Dip the work in the hot solution and permit it to dry without rinsing. Repeat this operation as often as needed until the proper shade is obtained.

The arsenic bath with current also gives interesting antique effects.

Arsenious acid	15 oz.
Ferrous sulfate	2 oz.
Hydrochloric acid	1 qt.
Water	to make 1 gal.
Temperature	100 deg.

Use at 6 volts with carbon or steel anodes. Avoid breathing in the vapors from this bath.

Brown Shades

Brown shades on cadmium can be achieved by use of this solution:

BRIGHT NICKEL BARREL PLATING IS HERE!

After extensive tests in actual plant production, we offer the Udylite Barrel Bright Nickel Plating Process to the metal finishing industry.

Now, bright nickel deposits of specification thicknesses may be secured economically and efficiently by means of barrel plating. No more racking of small parts . . . no more buffing or burnishing after plating.

The entire process, which includes plating solution, anodes, brightening materials and equipment, is available now.

Write for full particulars.

THE UDYLITE CORPORATION
1651 E. Grand Blvd., Detroit, Mich.

New York
60 E. 42nd Street

Chicago
1943 Walnut Street

Cleveland
3756 Carnegie Ave.

Copper nitrate	4 oz.
Potassium permanganate	½ oz.
Water	1 gal.
Temperature	160 deg. F.

The color varies from yellowish to reddish brown; occasionally a greenish tinge is produced, depending on the time of exposure to the bath.

Other yellow to brown shades can be produced from a solution made up according to the following formula:

Potassium permanganate	20 oz.
Cadmium nitrate	7 oz.
Water	1 gal.
Temperature	150 deg. F.

If the concentration of cadmium nitrate is increased, the colors get darker in hue. As the concentration of cadmium nitrate is fairly high in this bath and cadmium salts are expensive, precautions should be taken to conserve the liquid dragged out by the use of a small rinse tank. This drag out can then be used to replenish the coloring tank.

A deeper reddish brown can be had by utilizing the following formula:

Potassium permanganate,	40 oz.
Ferric chloride	3 oz.
Cadmium nitrate	13 oz.
Water	1 gal.

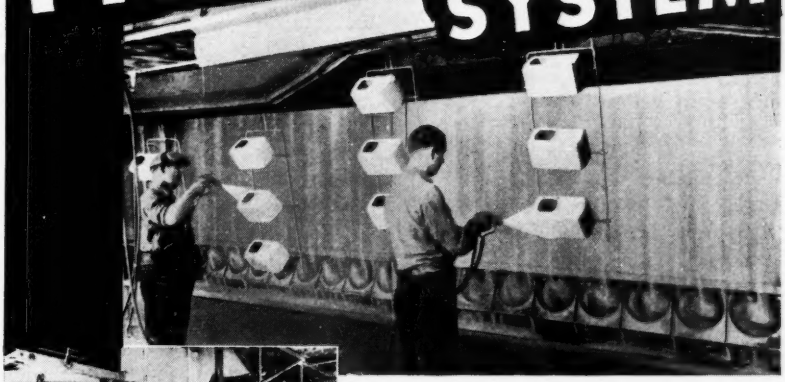
When the bath is ready to operate, add a few drops of concentrated nitric acid. It should be run hot at about 180 deg. F.

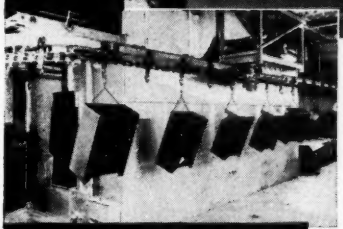
In the use of these coloring solutions it will be found that work will color best when it is taken directly from the cadmium plating bath, rinsed and put right into the coloring bath, without any burnishing, scratch-brushing, or polishing. Any intermediate polishing treatment will permit the surface to become coated with a film of oxide or other matter and prevent the rapid formation of the color desired. In this connection it is interesting to note that many practical platers and colorers of gold know from experience that a fresh deposit of brass right from the plating tank will always take an immersion gold deposit more rapidly than a brass deposit that has been polished. For this reason, the colorer will very often deposit a flash of brass over a polished brass piece before dipping in the gold solution, much to the boss's amazement—if he ever gets a chance to know about it. There is a theoretical justification for this strange practice. A piece of brass that has been polished to a high luster contains on and in its surface grease, dirt and other foreign material that has been forced in by the action of the polishing wheel. The very thin layer of surface metal containing these impurities, which according to metallurgists is in amorphous form and is commonly referred to by them as the Beilby layer, after its discoverer, takes longer to color and does not give as uniform a color, as freshly deposited brass, because the metal is surrounded by foreign matter. It's common sense—almost.

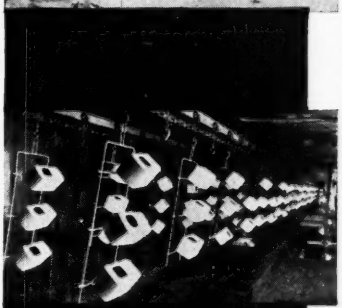
Coloring Zinc

The things that have been said about cadmium hold even more so for zinc, since it is a much more active metal. No direct coloring method for zinc exists because it forms practically no colored compounds that are insoluble. The only one is chromate and that is pale yellow. There are several patented methods for forming the phosphate which is an insoluble compound, but the phosphate is white and therefore worthless to the colorer. Its value lies in the fact that it makes an excellent paint base. Therefore, the only coloring methods for zinc are by precipitation of other metals and their compounds.

Another Complete Mahon FINISHING SYSTEM







. . . *Another Manufacturer Reduces Finishing Costs*

The thorough engineering and planning that goes into a complete Mahon Finishing System leaves nothing to chance . . . each individual installation is designed especially to do a particular finishing job with maximum efficiency at the lowest possible cost. That is why so many manufacturers turn their entire finishing problem over to Mahon engineers . . . they do it with complete confidence—because, they know that the Mahon organization, backed by seventeen years of research and practical experience in this highly specialized field, is equipped to do a better engineering job on equipment of this type . . . they know also, that a Mahon installation will be perfectly coordinated to produce the desired results in continuous operation. You can improve the finish on your product and reduce your finishing costs too! Call in a Mahon engineer now—consultation will not place you under any obligation.

THE R. C. MAHON COMPANY

DETROIT — — CHICAGO

Designers and Manufacturers of Complete Finishing Systems. Metal Cleaning Machines. Rust Proofing Machines. Drying Ovens. Hydro-Filter Spray Booths. Baking Ovens. Hydro-Foam Dust Collectors and Many Other Units of Special Production Equipment.

MAHON

Dark Blue

Zinc can be colored dark blue by the bath given below:

Nickel ammonium sulfate	6 oz.
Ammonium chlorate	6 oz.
Water	1 gal.
Temperature	180 deg. F.

This bath works something like the luster bath. The colors rapidly change from yellow to deep blue.

Blacks

Black is the most popular color finish for zinc. Several different baths for obtaining black finishes are given here:

1. The copper sulfate - potassium chlorate bath. (This has been described under cadmium.)

2. Potassium permanganate bath. (See above.)

3. Selenic acid bath. (See article on coloring iron.)

4. A solution of antimony chloride, about 12 oz. in a gallon of alcohol can be applied to the work with a rag and rubbed dry. This process is repeated several times and the work is placed in a warm place to dry. The finish must be lacquered or oiled with linseed oil.

5. One of the best blacks for use on zinc is black nickel. The description of this type of bath merits an article in itself so only the standard composition of the bath will be given without any other comment.

Nickel sulfate	10 oz.
Nickel ammonium sulfate,	6 oz.
Zinc sulfate	5 oz.
Sodium thiocyanate	2 oz.
Water	1 gal.

The temperature is room temperature. The voltage ½ to 1 volt and the current density about 1 ampere per sq. ft. The anodes can be nickel, carbon or stainless steel or a combination of these.

6. A very fine black that is blacker than black nickel can be obtained by immersion is the black produced by the precipitation of molybdenum sesquioxide on the zinc surface. This can be obtained by using the following formula:

Ammonium molybdate	2 oz.
Amonium chloride	4 oz.
Boric acid	1 oz.
Potassium nitrate	1 oz.
Water	1 gal.
Temperature	180 deg. F.

An immersion of a few seconds is generally sufficient to produce a deep black on zinc.

Other Colors

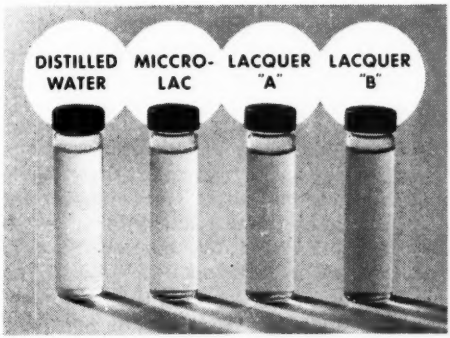
Zinc and zinc alloys can be plated with copper from a cyanide bath and the copper thus plated can be colored in a number of ways such as were described in Part IV of this series of articles. The copper deposit must be heavy, however, since thin layers of copper tend to diffuse into and are absorbed by the zinc, with the gradual disappearance of the colored finish.

* * *

In Part VI of this series which appeared in the June issue, the statement in the first paragraph ". . . a typical example being '18-8' stainless steel which contains 18 per cent chromium and 8 per cent silicon" should have read ". . . a typical example being '18-8' stainless steel which contains 18 per cent chromium and 8 per cent nickel."

Mention PRODUCTS FINISHING when writing to advertisers. Your cooperation will be appreciated both by the advertiser and this magazine.

A *New* COATING MATERIAL
That *Protects* and *Beautifies*
ANY NATURAL OR PLATED FINISH



IT'S WATER WHITE

Miccrolac is a protective coating which, before and after application, is of a color which approximates that of water. At the left is a direct reproduction of an unretouched photograph showing Miccrolac compared to distilled water and two other well-known coating materials used for the same purpose.

• Again a new "Miccro" product offers advantages unequalled by any similar material. In addition to its clarity of color, Miccrolac provides a very high lustre . . . excellent adhesion . . . extreme flexibility . . . good abrasion resistance . . . and exceptionally fast drying qualities. It offers effective resistance to sulphur dioxide, sunlight, moisture (preventing rust), oil, grease, gasoline and all commonly known chemical fumes. It does not blush even in the most humid weather. It comes ready for use—requiring no mixing with thinner—insuring absolutely uniform results. This also eliminates all possible chance of contamination during the mixing operation, and does away with the guesswork and extra labor usually involved in adding thinner to the lacquer.

WRITE TODAY FOR COMPLETE DETAILS

MICCROLAC

PROTECTIVE COATING No. 71

MICHIGAN CHROME COMPANY

6342 East Jefferson Avenue • Detroit, Michigan

FINISHING CONTAINERS AT ALLIS-CHALMERS PLANT

A FINISHING system, installed at the Allis-Chalmers Plant, Pittsburgh, Pennsylvania, includes complete equipment for cleaning, rust proofing, drying, painting and baking operations in the production of transformer containers, which range in size from 31 in. dia. x 38 in. deep to 41 in. dia. x 44 in. deep. The entire system was engineered and coordinated by the R. C. Mahon Company to meet the manufacturer's specific requirement in the application of two coats of synthetic enamel in the finishing process.

The transformer containers are carried through the system, on a monorail conveyor, suspended in an inverted position. They pass through washing, rinsing and rust proofing stages of the system, then through a direct gas-fired drying oven into a Hydro-Filter spray booth where the first coat is sprayed by hand. The product is then carried into and through a baking oven where the first coat is baked at a temperature of 350 deg. The conveyor then carries the product out of the oven, through a cooling zone, and into a second Hydro-Filter spray booth, where the second or final coat is applied, and thence into the baking oven where the final coat is baked at a temperature of 350 deg. The conveyor then carries the product to the unloading zone which is adjacent to the loading area.

The washing and rinsing stages are heated by means of immersion

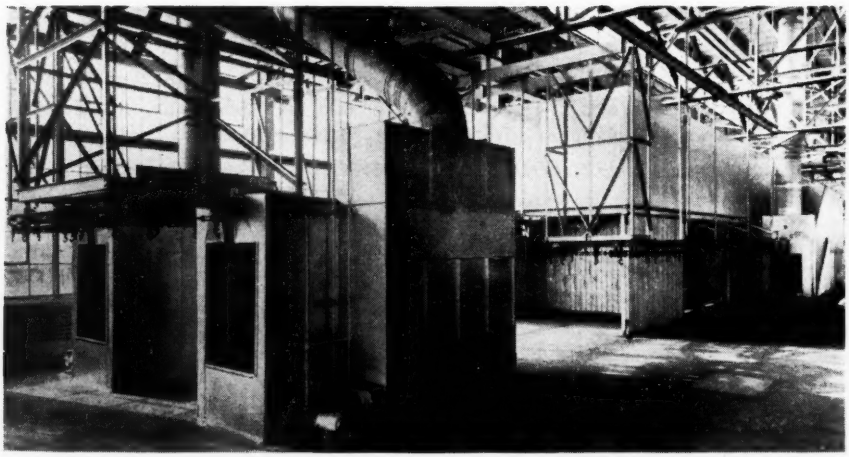


Fig. 1—A general view of the Mahon finishing equipment installation showing two spray booths in the foreground.

type gas heaters in which the gas is burned in tubes submerged in the solution in the tanks. The rust proofing section is heated by means of a direct-fired gas heating system in which the gas is burned directly in the processing chamber. This method of heating eliminates considerable build up of scale on the heating equipment, and also provides better conditions for rust proofing in the processing chamber, due to the fact that a large percentage of the oxygen is burned from the atmosphere in the process stage and, processing is accomplished in partially reduced atmosphere.

The gas burners on all of these tank heating units are fitted with complete safety and temperature control systems. The safety control units are designed to automatically cut off the main gas valves in case the pilot lights are extinguished, or

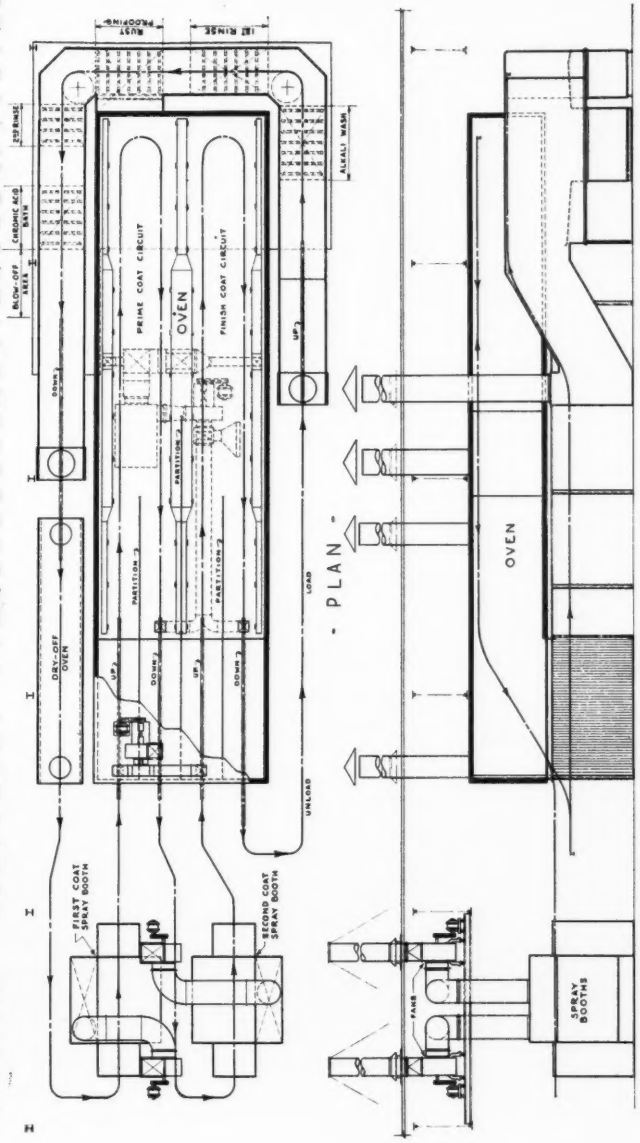


Fig. 2 — A plan and side elevation view of the completely conveyorized finishing system, which includes cleaning, rustproofing, rinsing, chromic acid dipping, spray painting, and baking.

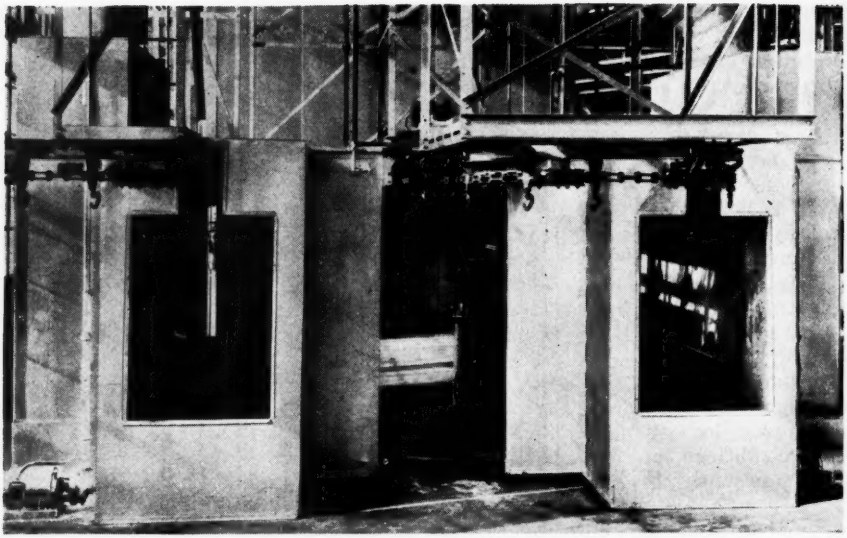


Fig. 3—A close-up view of the entrance ends of the first and second coat spray booths.

when electric current fails or gas pressure drops below a pre-determined point. The temperature control units are designed to maintain an operating temperature in the tanks in approximately 180 deg. Gas burners are designed to operate on a high-low operation.

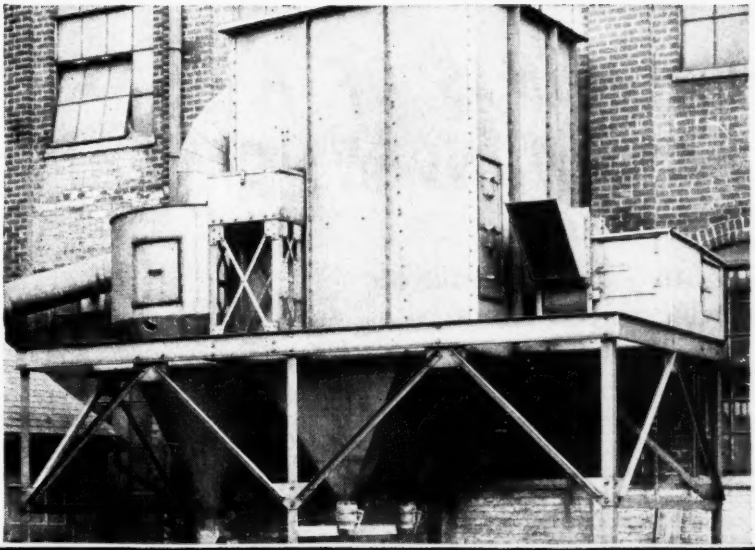
At the exit end of the washing, rust proofing and rinse units, an automatic blow-off is provided to remove entrained water held in the bottom of the inverted transformer containers. This is a very necessary operation to insure the removal of all excess water before entering the dry-off oven. In this installation, the blow-off air is taken from the blower that supplies combustion air for all of the gas burning equipment.

The dry-off oven is heated by means of a direct-fired line burner mounted on the floor of the oven and designed to operate on high-low operation.

The two Mahon Hydro-Filter Spray Booths are of the open top, down-draught type fitted with full flooding curtains so that the entire back of the booth is flooded with water. All over-spray or pigment is removed from the air in the centrifuge section of the Hydro-Filter chambers before it passes out through the exhaust fans.

The baking oven, for both first and second coats, is heated by means of a Surface Combustion direct gas-fired air heater designed to burn gas in the combustion chamber, and circulate the heated air and products of combustion through the oven proper.

This finishing system was designed to do a specific job thoroughly and economically. At its normal conveyor speed of 3 ft. per minute, it handles fifty transformer containers per hour. The conveyor is equipped with a variable speed drive which permits a conveyor speed range of approximately 50 per cent above and below normal operating speed.



KIRK & BLUM
DUST CONTROL SYSTEM

REDUCES INSURANCE RATES

This Kirk & Blum Dust Control System collects dust in one of the nation's largest plants for producing bearing metals. Only one of many advantages secured has been a reduction of insurance rates and hence a real saving on insurance costs.

Kirk & Blum Engineers have had years of successful experience in the metal industries. They will make a survey of your plant and submit recommendations on how you can improve production and save money through efficient dust control methods.

Write for booklet "Dust Collecting Systems in Metal Industries." It gives lists of users, shows pictures, gives details of installations. Complete facts regarding our services available on request—no obligation to you.

THE KIRK & BLUM MFG. CO., 2816 Spring Grove Ave., Cincinnati, Ohio

Chicago Representative—C. P. Guion, 1661 N. Milwaukee • Pittsburgh—Bushnell Mchy. Co., 311 Ross St. • Louisville—Liberty Eng. & Mfg. Co., Inc., 1450 S. 15th St.

HIGHPOINTS OF A.E.S. CONVENTION PAPERS

Metallurgical Aspects of Hydrogen in Electroplating

By C. A. Zapffe
and C. L. Faust

FUNDAMENTAL and experimental considerations of hydrogen in metals, particularly in steel, are discussed from a metallurgist's viewpoint to convey to the electroplating industry some of the important results obtained in recent metallurgical researches on hydrogen in steel. The tremendous effect exerted by hydrogen on metals is briefly explained and metallurgical data for hydrogen - metal reactions during acid pickling and cathodic electrolysis are presented to supplement those already known by electroplaters.

The importance of hydrogen absorption by steel to electroplated ware is demonstrated by experiment to show that lifting and blistering, and possibly poor adherence, may be caused by this gas through its effusion from the steel base at ordinary temperatures, and that occurrence of the defects is especially favored by heating. Effusion of the gas from the steel base during electroplating is a cause of gas pits, because it is difficult for metal ions to deposit over small holes through which gas is continually escaping.

Embrittlement and hardness of electrodeposits are discussed, and an explanation is afforded for the descaling action that occurs during cathodic electrolysis. Hydrogen absorption is shown to be severe during cathodic cleaning in either acid or alkaline solutions. Suggestions are made for preventing hydrogen-caused defects in electroplate.

• • •

Notes on the Spot Test for Thickness of Chromium Coatings

By W. Blum
and W. A. Olson

SPECIFICATIONS for electroplated coatings that include requirements for a certain minimum thickness of coating, involve the selection of simple but reliable tests of local thickness. Most of the methods used for coatings of other metals are not applicable to the customary very thin decorative chromium coatings, which are usually only from 0.00001 to 0.00003 inch thick.

Several years ago a "spot test" for the thickness of chromium was developed and has come into extensive use, especially in the automobile industry. This test depends upon the measurement of the time required for one drop of concentrated hydrochloric acid to dissolve the chromium coating. Apparently the test was at first simply conducted at "room tempera-

ture," but it was soon realized that fairly close control of, or correction for, the temperature was necessary to insure consistent results.

At the American Electroplaters' Convention in 1937, data were presented by P. W. C. Strausser and by W. L. Pinner and L. B. Sperry upon the effect of temperature upon the spot test. Because the results in these two papers were differently expressed, no attempt was apparently then made to correlate the two investigations. Strausser's data were used for the curve in the Joint Specification (ASTM Designation A219-39T) adopted in 1939 by the American Electroplaters' Society and the American Society for Testing Materials.

Recently it was informally reported by E. M. Baker and W. L. Pinner that results obtained in practice did not closely conform to either of the above sets of data. In the brief investigation reported in this paper, the causes of certain discrepancies were revealed, and the importance of controlling not only the temperature but also the concentration of hydrochloric acid was established.

This paper indicates that it is not sufficient to merely specify "concentrated hydrochloric acid" for use in making spot tests for the thickness of chromium coatings. Reliable calibration of any indirect method for measuring thickness of coatings depends upon the use of specimens with coatings of known, uniform thickness, the preparation of which requires considerable care. The method of testing and the reproducibility of results is also included in this paper.

Previous observations have been incorporated in the description of the spot test included in this paper, which has been recommended as a substitute for the procedure now included in the Tentative Methods of Test for Local Thickness of Electrodeposited Coatings on Steel, as adopted in 1939 by the American Electroplaters' Society and the American Society for Testing Materials.

• • •

Magnesium as a Control Agent for Zinc Anodes

By R. O. Hull

THE principle utilized in the present method for controlling zinc anode efficiency is believed to be unique in electroplating and consists of adding a small amount of magnesium or calcium as a secondary metal during the process of manufacture of zinc anodes. Both of the secondary metals are highly reactive and form compounds of low solubility in cyanide solutions. In the plating bath the secondary metal dissolves and precipitates as an insoluble compound, presumably hydroxide of carbonate, forming a thin gelatinous coating over the anodes.

This coating exercises a two-fold effect on anode behavior.

First, it reduces the rate of anode solution, or anode current efficiency, by an amount proportional to the content of secondary metal in the anode, since this factor controls the thickness of film built up on the anode. The insoluble film might be expected to continue to build up until ultimately no current could pass through the film. However, experience indicates that the film apparently assumes a definite maximum thickness, depending upon the secondary metal content, following which the anode efficiency remains constant.

The second effect of the coating of insoluble magnesium or calcium compound formed continuously is that it

unites mechanically with loose sludge from the anodes and carries it to the bottom of the plating tank where it obviously cannot interfere with the deposits. Hence, baths using anodes containing magnesium or calcium are characterized by relative freedom from objectionable anode sludge floating about in the solution.

• • •

Our Patent System and the Electro-Processing Industry

By H. A. Toulmin, Sr.

FUNDAMENTALLY, the patent system is founded upon the idea that industrial prosperity and employment depends upon creating new businesses with new products and the expansion of old businesses with improved machinery and processes. To encourage such investment, with its gamble of hard work and risk of capital involved, the Government gives exclusive rights under patents to inventors and those who own patents for a limited period of seventeen years. In return, the inventor does two things: He gives the world immediately the benefit of the knowledge of his invention through his patent so that others may carry on in an industry and at the same time, it protects the invention so that the owner can amortize the investment in his research and engineering and will be encouraged to invest in machinery, sales organization and advertising because he will have a monopoly long enough to pay for this investment and yield a profit.

A careful study by the writer over a long period of years of the state of this art, the experience gained in the trial of patent cases involving this industry and in an observation of what is now going on in this and other fields of research and development leads him to state that we are just entering a great renaissance in electro-deposition research. There is no industry that has greater opportunity in so many fields as this particular industry. The developments abroad which will be patented by foreign countries in this country should challenge us not only to keep abreast of these industries but ahead of them so that America will not have to pay tribute under patents owned by foreign industries.

To achieve and maintain this leadership we must not only explore the fundamental fields of the structure of deposits, grain size, the physical-chemistry of addition agents, depositing of organic materials from aqueous solution, the composition of baths, the question of polarization and gas over voltage, but we must carry out a sound patent protection policy, a policy of respect for good patents with a united front towards bad patents. We must keep the fruits of American research for Americans with American patents, but unless those patents are founded on teamwork in research they will fail.

• • •

Disposal of Plating Room Wastes

By T. J. Fadgen

RECOGNIZING the problems concerning the disposal of trade wastes, the General Motors Corporation gave careful consideration to methods of waste disposal when considering the erection of a Trenton division of the Ternstedt Manufactur-

This is NEWS!
Volume I—No. 6
New York, N. Y., April 26, 1940
NATIONAL METAL EXPOSITION SPACE OVER-SUBSCRIBED SEVEN MONTHS IN ADVANCE OF OPENING OCTOBER 21
Private Buildings Erected by 38 Companies At Tulsa Show
A M A Will Use Four Floors at N. Y. Meet
HEAVY DEMAND FOR METAL SHOW SPACE MORE TO BE ADDED
Over 86,000 Square Feet Reserved—More Space Than Used in 1939

...NEWS THAT MEANS MORE SALES FOR METAL EXPOSITION EXHIBITORS

When this story broke in the newspapers, metal men forgot political news for a while—forgot World War No. 2—and started to speculate about this biggest National Metal Exposition which will open in October at Cleveland.

If this is the biggest Metal Exposition in 22 years, they said, we'd better be there to get our share of the business. Because last year 33,000 of our best prospects attended the Metal Exposition.

And so . . . to the Metal Exposition headquarters in Cleveland . . . have come letters, wires and telephone calls by the dozens. Reserving spaces for big and little companies who sell the metal industry everything from pyrometers to tons of steel.

But there are still plenty of good spaces left at the regular $1.00 a square foot rate because Cleveland's ample Public Auditorium provides more than 150,000 square feet for the Metal Exposition.

So write or wire collect today for full particulars. Address: W. H. Eisenman, Director, National Metal Exposition, 7301 Euclid Avenue, Cleveland, Ohio.

The WORLD'S GREATEST EVENT IN THE METAL INDUSTRY 70% NEW ATTENDANCE EACH YEAR

COOPERATING SOCIETIES

American Society for Metals
Wire Association
American Welding Society
Iron & Steel Division and Institute
of Metals Division of the American Institute
of Mining & Metallurgical Engineers

NATIONAL METAL EXPOSITION

AND METAL CONGRESS

OCTOBER 21-25, 1940 *Cleveland, Ohio*

MANAGED BY AMERICAN SOCIETY FOR METALS

ing Corporation. As the major problem would be the disposal of plating room wastes, considerable research was done to secure all available information concerning methods for their disposal as well as data concerning those likely to involve sewage plant problems. Knowledge concerning disposal problems was secured from the operations of the trade waste treatment plant of the Chevrolet Motor Co., at Flint, Mich., while sewage plant information was supplied from New Jersey and Michigan city, county, and state authorities. The requirements outlined by the city of Trenton, N. J., are summarized as follows:

1. The wastes must not deteriorate the sewer system.
2. The wastes must respond to sewage plant treatment processes.
3. The volume should be kept within the capacity of the sewage disposal system.
4. The trade waste must be maintained at or above a pH of 7.

A detailed explanation of the manner in which the plating room wastes are handled, treated, and then disposed is contained in this paper.

• • •

The Magnesium Copper Sulphide Rectoplater as a Source of DC Power for Electroplating

By C. A. Kotterman
and W. R. Binai

THE mechanism of the magnesium copper sulphide rectifier is described. Fundamental transformer-rectifier circuits are evaluated in terms of useful power supplies for electroplating. Air blast cooling of transformers and rectifiers is discussed showing how economical and compact power supplies result. Two different types of plating power supplies are described; one being the custom built Rectoplaters in capacities of 1,000 amperes and upward; the other a simplified standardized power pack having two or three voltage outputs with a capacity of 500 to 750 amperes per bridge. DC voltage control of the Rectoplater is by means of a primary tap selector switch providing a voltage adjustment of one-half voltage to full voltage in 8 to 12 steps. DC output voltage of the Plater Power Packs is by means of an auxiliary auto-transformer, available as an accessory, where one-half to full voltage output adjustment is required and provides a remote control for the power supply. The article is concluded with a summary of the advantages of the magnesium copper sulphide rectifier as a DC power supply for electroplating.

• • •

Chemical Evaluation and Control in Metal Cleaning

By Jay C. Harris

FUNDAMENTALLY, the scouring, washing or cleansing process for metal surfaces comprises the following steps:

1. Reduction of the affinity of the soil for the surface to be cleansed.
2. Application of sufficient mechanical action to ensure removal of the soil from the surface.
3. Ability of the added material to suspend the soil in solution.
4. A sufficient reduction of affinity of soil for the article, so that the soil can be rinsed or

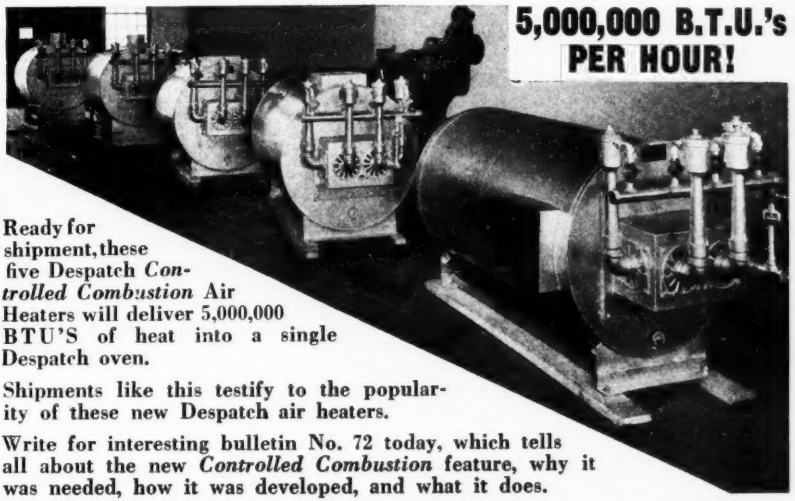
flushed away, or the article removed from solution without redeposition of the soil.

These steps are the familiar soak, wash and rinse operations which are as usual to laundering, dry cleaning, and bodily sanitation, as they are to metal cleaning. It should be recognized that in many cases water alone with violent mechanical action will produce a certain degree of cleansing but that chemical assistants are a necessity for adequate results. Furthermore, it should not be expected that by simply adding a chemical to a bath the ultimate in cleansing will be produced, for well designed equipment will provide the agitation or mechanical action necessary to complete the removal of soil from the surface being cleansed. A further fundamental to proper cleansing results is the recognition of the type of soil present and the best chemical assistant to aid in its removal, as well as the use of equipment in which these results may be accomplished.

A practical outline of metal cleaning processes follows:

1. Solvent degreasing.
2. Alkaline scouring.
3. Emulsion scouring.
4. Electrolytic cleaning.
5. Pickling.
6. Burnishing.
7. Wheel polishing and other mechanical cleansing methods.

It is obvious that each of the foregoing processes merits separate treatment, but fundamentally they all accomplish cleansing by the mechanism described above. This treatment therefore covers the subject in a general form from the standpoint of



5,000,000 B.T.U.'s PER HOUR!

Ready for shipment, these five Despatch *Controlled Combustion* Air Heaters will deliver 5,000,000 BTU'S of heat into a single Despatch oven.

Shipments like this testify to the popularity of these new Despatch air heaters.

Write for interesting bulletin No. 72 today, which tells all about the new *Controlled Combustion* feature, why it was needed, how it was developed, and what it does.

DESPATCH OVEN CO. 622 S. E. NINTH ST. MINNEAPOLIS, MINN.

chemical assistants used, and chemical methods of their evaluation or control in commercial use.

• • •

The Relationship of Cleaning Techniques and Adhesion of Electrodeposits

By B. F. Lewis

ORDINARILY, the passivity induced by electrolysis in cleaning solutions may be readily dissipated by a simple acid dip. In the case of cleaning solutions contaminated with metal salts and certain acid radicals which accumulate over a period of use, it is quite possible to develop cathodic or anodic films on the metal surface which interfere seriously with reactivation of the surface. For example, if a steel object is made the anode in a cleaning solution containing alkali phosphate and sodium resinate, under certain conditions of concentration, temperature and current density, the points of highest current density may become coated with iron oxide. This effect is due to the concentration, in the low pH anode film, of the radicals of alkali phosphate and sodium resinate together with nascent oxygen. Obviously, if so corrosive a reaction is possible on steel, the non-ferrous metals would be even more severely injured. Incidentally, some of the silicates of soda which are ordinarily excellent buffering agents in alkaline baths, react very unfavorably under some conditions of anodic cleaning. If used at low temperature, low concentration, and low alkaline ratio, silicic acid may be deposited on the metal surface.

From these observations, a few general rules for anodic cleaning on steel may be stated:

1. Maintain a high ratio of alkali to radicals such as phosphate, silicate, or resinate.
2. Operate the bath at temperatures high enough to promote mobility of the solution and rapid replacement of alkali at the anodic work surface.
3. Avoid excessive current density, especially when conditions (1) and (2) are not under control.

• • •

The Plating and Heating of Zinc Base Die Castings

By F. F. Oplinger

FOLLOWING polishing and buffing, castings should, whenever possible, be plated immediately to prevent the formation of objectionable films on the polished surface due to air oxidation and contact with alkaline or acid fumes. Castings which have been allowed to age for long periods of time after polishing and buffing, should be rebuffed prior to plating. If they are aged for a sufficiently long period, blistering on unbuffed areas may be very difficult to avoid.

The precleaning or removal of buffing compound is an extremely important step. Solvent degreasing is generally used and gives most excellent results when the equipment is properly designed and the basic principles underlying solvent degreasing are definitely understood. This is especially true for large size production of widely varying sizes and shapes frequently carrying large quantities of buffing compound.

Means for degreasing with aqueous

solutions are also being used. For the best results the precleaning operation must be carried out in such a way that all grease, buffing compound, or dirt is removed without discoloration or change in appearance of the surface casting. The precleaning should be of such efficiency that very mild alkaline cleaners can be used following the degreasing. If strong alkaline cleaners are required due to improper degreasing to remove dirt of grease left by the degreasing operation, the best results cannot be obtained because strong alkaline cleaners attack the base metal. The casting following the degreasing should have the same appearance as if scrubbed by hand using clean solvent and a soft brush.

For cathodic cleaning following solvent degreasing, the best results have been obtained using the following solution:

Trisodium phosphate—
0.5—1.0 oz./gal.
Soda ash .....1.0—2.0 oz./gal.
Temperature...160—180 deg. F.
E. M. F.....6 V.
Time.....30 sec. to 2 min.

Strong alkaline cleaners, for example, trisodium phosphate, six ounces to the gallon, can be used if the time of cleaning is limited to 10 to 20 seconds. Such a time cycle cannot always be used in conveyor units, hence a lower concentration cleaner in which the cycle can be widely varied is recommended.

Excellent results have been obtained on a large commercial scale using a trisodium phosphate immersion cleaner (no current) having a composition of only 0.4 ounces to the gallon. Time of immersion—1½ minutes.

In general, dilute cleaners should be discarded frequently, on continuous operation on a large scale, possibly every day. The cost is quite

"PLATING RACKS STILL PERFECT AFTER 6 MONTHS SERVICE!"

WRITES UNICHROME* RACK COATING-W USER

You want to save money by getting longer life from your plating rack coating. Read what one user of "Unichrome" Rack Coating-W says . . .

"One set of racks coated with your Rack Coating-W is in use in the cleaning and bright nickel cycle; the other in cleaning and chromium plating. They're still in perfect condition (after 6 months' service). It's the best material on the market."

From many other letters in our files come comments like this. For in "Unichrome" Rack Coating-W users find a coating material with a *combination* of advantages . . .

1. Not affected by boiling cleaners or plating solutions.
2. Does not blister or crack.
3. Tough—withstands wear and tear of normal handling.
4. Contains no ingredient harmful to any plating solution.
5. Cuts costs—by greatly reducing frequency of recoatings.
6. Easy to apply—by "dip and force-dry" method.
7. White in color—easy to see how completely the rack is covered.
8. Any part of rack can be recoated without necessity of recoating entire rack.

Write for Bulletin No. 31
Containing complete information

Platers without rack dipping and drying facilities may have their racks coated with "Unichrome" Rack Coating-W by making arrangements with Chromium Corporation of America, 4645 West Chicago Avenue, Chicago, Illinois; Lea Manufacturing Company, Waterbury, Conn., or Belke Mfg. Company, 747 N. Cicero Avenue, Chicago, Illinois.

UNITED CHROMIUM
INCORPORATED

51 East 42nd Street, New York, N.Y.
2751 E. Jefferson Ave., Detroit, Mich.
Waterbury, Conn.

*Trade Mark Reg. U. S. Pat. Off.

small and will soon be offset by rejections if any appreciable amount is obtained.

Recently, several firms reported excellent results through the use of mild cleaners in which the parts are treated anodically. Regardless of just what composition or type cleaner is used or whether anodic or cathodic, the best results on baking can be obtained only when the appearance and surface of the casting are virtually unchanged. This represents the so-called "mild cleaning" whereby "overcleaning" is avoided.

Only very dilute acid pickles are recommended. The best results have been obtained with muriatic acid, 0.5 to 1 per cent by volume. Sulfuric acid, 0.5 per cent by volume or stronger, does not appear to be quite as satisfactory.

Hydrofluoric acid (1 per cent solution) gives excellent results, but is not recommended because of the hazards involved. Acetic acid, 10 to 20 per cent, has on an experimental basis given excellent results and it appears that a greater flexibility of alkaline cleaners is permitted if acetic acid is used for pickling.

We have no knowledge of acetic acid being used commercially.

Solutions containing sulfuric acid or muriatic acid, 2 to 5 per cent by volume, are entirely too strong to use except where the time of immersion is limited to a few seconds. Dilute solutions are far more practical because a greater variation in the time factor is permissible.

The above applies mainly to castings which have to be baked. Severe etching has and is being used in isolated cases. Whether castings so treated can be heated at 300 to 350 deg. is doubtful. In any event the brighest plate cannot be obtained without buffing. Also rate of diffusion is increased in any event.

Our experiments indicate that a copper cyanide "strike" prior to either Rochelle or High Speed Copper plating at least to some degree gives the best results from a practical standpoint. One of the reasons for this is that precleaning on large size operations is rarely perfect. As the strike serves as a plater and cleaner through its use, there is also less chance of getting buffing compound or other objectionable colloids into the main plating solution. Better results are obtained on rejects when a strike is used.

Unbuffed areas require a more severe etch than polished areas: Hence, the necessity for having an acid dip which is sufficiently strong to affect the unbuffed areas but not too strong to damage the buffed area.

Where it becomes necessary to heat plated coatings on die castings for any reason up to 250 deg. to 350 deg. F., the following procedure is recommended:

1. Polish and buff as may be required.
2. Degrease thoroughly, using a three phase machine.
   Note: Discoloration of the casting, formation of spots, smut or incomplete removal of buffing compound must be avoided.
3. Treat cathodically in the following:
   Soda ash ..... 1—2 oz./gal.
   T. S. P.....0.5—1 oz./gal.
   E. M. P.....6 V.
   Temp., 160 deg. to 180 deg. F.
   Time.....30 sec. to 90 sec.
4. Water rinse.
5. Acid pickle.
   0.5—1.0 per cent HCl by vol.
   Temp. .....Room temp.
   Time.....30 sec. to 90 sec.
6. Water rinse.
7. Copper strike.
8. Copper plating.

Note: The above method is not necessarily the only method which can be successfully used. Also, other widely varying methods can be used for plating castings requiring no heating or where only low temperature heating (200 to 250 deg. F.) is required. Through its use we have, however, consistently been able to obtain satisfactory results heating at 300 deg. to 350 deg. F., for long periods of time.

Chemicals by Glyco. The latest edition of "Chemicals by Glyco" is now ready for distribution, according to a report made recently by Glyco Products Co., Inc., 148 Lafayette St., New York, N. Y. This company has again turned out a very comprehensive 96-page catalog describing glycol and glyceryl esters, emulsifying agents, special emulsions, synthetic waxes, synthetic resins and a number of specialties of wide interest and application.

Of considerable interest to all users of waxes are the new synthetic waxes recently introduced by the company and fully described in the catalog. These synthetic waxes, which range in melting point from 85 degs. C. to 135 degs. C., are made from domestic raw materials and are, therefore, not subject to variations, price fluctuations, and unavailability of imported natural waxes.

A section of the catalog is devoted to suggested formulae and other information for the manufacture of numerous types of products. The useful tables consisting of melting points of resins and waxes, pH values of acids and bases, and so on, is another feature of this work.

The extensive index divided into numerous industries, which was an innovation of the last catalog, has been continued and expanded. This index has proved of considerable value to users of the catalog because it gives them, in convenient form, information relating to their own field in which the various products manufactured by the Glyco Products Co., Inc., are suggested.

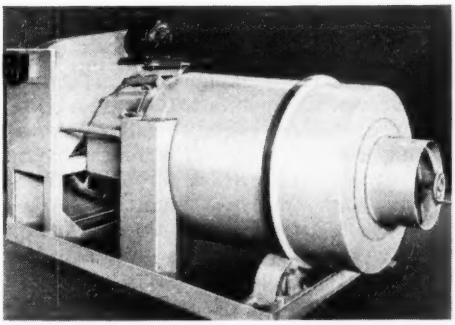
Copy free upon request.

Mention PRODUCTS FINISHING when writing to advertisers.

No Sifting or Shoveling with THIS Burnishing Barrel

It costs money and it takes time to sift burnishing balls out of the parts when you have finished burnishing them. Save all this time with a **Ransohoff** Automatic Ball Separation and Return — Automatic End-Unloading Burnishing Barrel.

Just load the parts into the drum and start the barrel.



The balls flow into the burnishing compartment and go to work. Reverse the barrel and as the machine unloads itself out of the end, it separates the balls and holds them ready for the next batch.

Let a **Ransohoff** Engineer show you how a machine can do all of the digging for you — burnish faster and reduce production costs.

N. RANSOHOFF, INC.

212 W. 71st St. CINCINNATI, O.

BARREL FINISHING OF METAL PRODUCTS

Continuing Factors on Soap and Its Relation to Hard Water.

By H. Leroy Beaver
Barrel Finishing Consultant
Lansdale, Pa.

IN the June discussion we stressed the importance of an adequate and constant check on the water supply principally with respect to its degree of hardness per U. S. gallon, and an approximation of the effect obtained when normal soaps are used in barrel finishing procedure without suitable alkaline builders and agents for water softening and the prevention of the formation of or dispersal of insoluble sticky lime soap curds.

To enumerate all of the various chemical combinations recommended for reducing water to zero hard or soft would be far too extensive for this series to contemplate, and their number and composition seemingly is increasing quite as rapidly as the multiplicity of products suggested for use as "wetting agents." Last month we commented briefly on both cream of tartar and Peruvian Soap Tree Bark. These two products are often used in combination and some users think that merely because soap tree bark, due to its natural content of saponins and glycrrhydes, it is capable of developing a lather under either acid or alkaline conditions, it is quite satisfactory in respect to its lubricating properties, or when used simply with water that the necessary lubrication is provided. Very simply, we have found this to be untrue, and our best thought is that soap tree bark rather than being depended upon as a satisfactory lubricant should be relegated to the dry cleaning and laundry business where a light soaping action is recommended for delicate materials or pastel shades that might otherwise be fugitive to the normal alkalis generally found in soaps.

In exactly the same sense there has been considerable discussion and some written comment regarding the use of the modern "wetting agents" for use as lubricants to replace soap in the barrel finishing process. All of our research points to wetting agents, or synthetic soaps so-called, as being entirely inadequate for producing sufficient lubrication for successfully carrying out the operation. True, most if not all of these wetting agents will produce a profuse suds, but this is not necessarily indicative of satisfactory or adequate lubrica-

tion in the carrying out of the barrel finishing process.

We have continually stressed the importance of controlled water for barrel finishing application and the use of alkaline builders, and we readily recognize the value of suitable wetting agents to be added to a soap —alkaline—wetting agent compound, but a soap used alone is quite as inadequate as a wetting agent used alone. Each of the component parts of a burnishing soap compound performs its own peculiar function, and none of the component parts when used alone will prove to be adequate for the requirement.

Except when used on brass or bronze or similar non-ferrous metals, our preference of a medium for prevention of the formation of or for dispersal of insoluble lime soaps would be tetra sodium pyrophosphate in the proportion of approximately 3 per cent added to the customary tallow base soap. Much comment has been made of the properties of wetting agents to provide for clean, clear rinsing with cold water at normal faucet temperatures. This can be just as well accomplished by the addition of quite liberal proportions of sodium silicate of either 1:2 or 1:3 composition which may be combined with the normal tallow base soap (generally used alone in most burnishing operations) and the tetra sodium pyrophosphate previously referred to. Sodium silicate in itself presents certain qualities for wetting.

A cocoanut oil-potash soap forming a jelly clear compound will readily go into solution in ice cold water, will produce a profuse creamy lather and rinse freely and yet cannot compare in lubricating quality to a stearic acid-sodium composition in barrel finishing applications.

To suggest that a wetting agent be used as a substitute for normal soap-alkali combinations in barrel finishing is to invite the average barrel operator to use too much of such a wetting agent when his final condition would, if anything, be worse than if he had used none at all. So far as our own experience goes, we have found that relatively small proportions or quantities of the modern wetting agents are required as addition agents, and their proportions will vary from a minimum of 1/10th of 1 per cent to a maximum of around 3 per cent. We have in mind one wetting agent that when used in a concentration of as little as .05 per cent will reduce surface tension from 72 dynes/cm to 34.5 dynes/cm, but if this same wetting agent were added in the proportion of a full 1.0 per cent the reduction in surface tension would only be to 27.5 dynes/cm. Thus, it will be seen that above a certain percentage, the addition of larger proportions of wetting agent are not proportionately beneficial, and indeed might well constitute when used in too large proportions, a considerable economic waste. Practically all of the applicable wetting agents are expensive, far more so than an adequate burnishing soap built-up compound, and for that reason no greater proportion should be used in burnishing soap solutions than is necessary to accomplish the desired operating condition.

The application of wetting agents in barrel finishing procedure differs quite materially from their use in still tank or electrolytic cleaning, because in barrel finishing we need not be concerned with our effective proportion of wetting agent maintained in the burnishing lubricating soap solution, for the reason that the soap solution is generally discarded after each load of work in process whereas

AIRWAY *Ventilated* BUFFS

To the Executive.

To the Purchasing Agent.

To the Polishing Room Superintendent.

Gentlemen:

It may be you don't even know what we are talking about because you have never used AIRWAY VENTILATED BUFFS, but that's no excuse. If you buy AIRWAY VENTILATED BUFFS then you will know what we are talking about when we say we will save you 50% on your cotton buff wheel costs.

JACKSON BUFF CORPORATION

L. W. MacFarland

President.

JACKSON BUFF

21-03 41st AVENUE

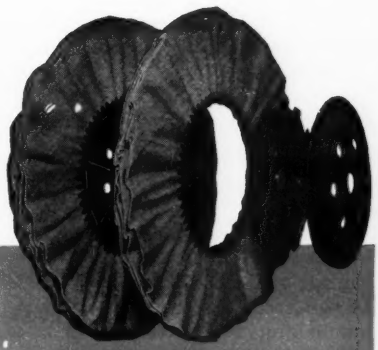
AIRWAY *Ventilated* BUFFS

We claim 50c on the dollar saving. We don't care whether it is $1,000.00 or $10,000.00. You can't with safety challenge that statement. We can with safety make it.

Warning Notice

Jackson Buff Corporation of Long Island City, New York, has rights to U. S. Patents Nos. Re 19,894 and 2,140,208 which have broad claims covering an air-cooled buff having means for the admission of air through the sides of the buff.

Owner intends to protect all rights and stop infringement.



CORPORATION

LONG ISLAND CITY, N.Y.

in cleaning procedure much of the average wetting agent is absorbed and dragged out with each succeeding lot of work.

There are three important factors in barrel finishing that are principally affected by the addition of alkaline builders and wetting agents. First, we have oil or grease; second, we have particles of solid soil matter. The third and at all times a difficult factor is inadequate rinsing of parts to be barrel finished following a conventional acid dip. When soap is used without suitable alkaline builders and wetting agents, the presence of even a small proportion of acid residue will cause rapid decomposition of the soap base. It seems a pity that only seconds are allotted for the operations of bright dipping and rinsing prior to barrel operation, and then anywhere from twenty minutes to three hours allowed for the barreling operation itself. We suspect that in all too many cases inadequate rinsing of parts and most especially of non-ferrous parts, has much to do with the complaint of poor burnishing results.

Some criticism has been made of the newer chromic acid base bright dips regarding the difficulty of clear, clean rinsing. Mr. Gustav Soderberg is of the opinion, and we are inclined to agree with him that chromic acid, due to its intense color, shows more readily the effect of inadequate rinsing. It may be that the conventional sulphuric-nitric-hydrochloric acid dip which is water clear, is inadequately rinsed due to the fact that it presents no intense color indicator.

It may be easily seen that alkaline builders are both important and essential not only to soften water but to neutralize the acid carried into the burnishing barrel due to inadequate rinsing following bright dipping. No market soap contains a sufficient excess of alkali to provide for such a condition and still retain a proper soap balance to provide for the necessities of the barreling operation.

An adequate wetting agent, added in proper proportions to a soap-alkali combination provides a surface active agent which causes the liquid to penetrate into pores and folds, deep scratches or discontinuities, and in so doing loosens up oil and grease as well as surrounds particles of solid residual soil, enabling them to be rinsed away following the completion of the barrel finishing operation.

Considerable has been written regarding the condition known as "preferential wetting" and "emulsification." Dr. L. P. Hall* has given us so many clean and concise definitions of the various phenomena involved in detergency that we are happy to quote two more of his definitions, as follows:

Preferential Wetting

"Preferential wetting of the surface being cleaned occurs after absorption takes place. A surface is preferentially wet when it takes up the detergent in preference to the soil thereon. Thus the soil is displaced by the wetting agent. Essentially, the action is analogous to **driving a wedge between the soil and the surface of the substance or material upon which it operates.**

Emulsification

"Emulsification of oily or greasy soil occurs at the same time as the soil is displaced through preferential wetting. The capacity of a detergent for lowering interfacial tension is a good indication of emulsifying properties. Ex-

*Dr. L. P. Hall, Rohm & Haas Co., Philadelphia.

periments show that interfacial tensions below 11 dynes per centimeter are necessary for satisfactory emulsification."

When measured by these standards, a suitable and adequate wetting agent will possess excellent emulsifying properties, but when so used, electrolytes such as alkaline builders and salts should be used to obtain the lowest possible interfacial tensions.

In general, we have found certain wetting agents that show marked value as an aid in emulsification of oil and grease on parts improperly cleaned prior to being placed in the burnishing barrel, for when added to alkaline built soaps they aid in obtaining the lowest possible interfacial tensions. Further than this, they have a marked value as lather stabilizers for due to their intense soaping or lathering properties they tend to markedly aid the building of a stable suds for holding in suspension the grease, dirt or soil removed from both the surface as well as the pores of metal parts, thus holding them in suspension until they can be rinsed away.

The matter of the maintenance of a stable suds in barreling operations is always important. In determining the hardness of water by the use of Standard Soap Solution until we obtain a stable suds one inch thick that remains stable for one full minute, by a simple process more fully covered in a preceding paper, we have in such stable suds maintenance the answer to another rule and that is that if the barrel operator simply scoops up a handful of suds from the barrel, if it remains stable for one minute it may be considered that sufficient soap is in solution to provide for satisfac-

← RIGHT SIGNAL →
FOR FLASHER CELLS

"THOUSANDS AND THOUSANDS of these flasher cells for auto directional signals pass through our Metso 99 baths before cadmium plating, without complaint."

Quantity production needs Metso 99's speedy emulsifying power to remove oils and grease completely so that rejects are minimized. Yet Metso 99 costs you less, for it is priced as a basic alkali.

For rush orders Metso 99 Cleaner saves time and money. Break up the "traffic jam" in your plating department, by switching to Metso 99.

METSO CLEANERS

PHILADELPHIA QUARTZ CO.
Gen'l Offices: Ionic & 3rd Sts., Philadelphia
Chicago Sales Office: 205 W. Wacker Drive

tory lubrication, but if the suds falls rapidly and only leaves the hand wet with no indication of any slippery feel, this immediately indicates the necessity for the addition of soap to the burnishing solution which should be tested until it shows a suds maintenance of one minute.

In a rapidly falling suds grease, dirt or soil held in suspension will simply be redeposited on the surface of both parts in process and burnishing materials, but with the addition of a proper wetting agent that provides low absorptive properties there is less tendency for such dirt, grease or soil to cling to the surface. If the lather is a stable one and sufficiently tenacious to hold unwanted materials in suspension, and it can be made so by the addition of suitable proportions of alkaline builders and wetting agent, then the rinsing will be readily found to be more adequate and complete.

Hartzell Propeller Fan. A new catalog, No. 12, of 32 pages and cover has just been issued by Hartzell Propeller Fan Co., of Piqua, Ohio.

The new catalog illustrates and describes the entire line of Hartzell Propeller-type fans and blowers, and gives complete air-delivery tables on each size of them. Air deliveries given are the results of tests according to the standard test code of the Propeller Fan Manufacturers' Association, of which organization Hartzell is a member.

Many new sizes and models are contained in the new catalog. The "Tear-Drop" propeller line, especially, has been enlarged and developed so that it now includes fans and blowers of all sizes and types. This propeller design, patented by Hartzell, is a recent development of the Hartzell engineering laboratories. It is said to operate more quietly and at slower speeds than the ordinary fan.

Among new models shown in the catalog are fans with the motor entirely out of the air-stream, allowing use in locations where excessive abrasive or corrosive elements in the air-stream might affect the motor, or in localities where industrial codes prohibit the use of a fan with motor in the air-stream. A new blower, also with motor outside of the air-stream, is also included in the catalog. Intended for installations where back-pressures are encountered, the new blower is designed for the same general uses as the fan.

Hartzell air-moving equipment is sold through sales-engineering offices located in principal cities throughout the country.

Copy free upon request.

A Dictionary of Metals and Their Alloys. By F. J. Camm. 245 pages, fabrikoid covers. Published by Chemical Publishing Co., Inc., 148 N. Lafayette St., New York, N. Y. Price, $3.00.

This book contains information regarding every known metal and practically every type of commercial metallic alloy. It is alphabetically arranged and adequately cross-referenced, and, where necessary, historical facts have been included. In addition, there are special sections on hardening, case-hardening and tempering, electroplating, polishing, chemical coloring, metal spraying, and rustproofing, as well as useful tables.

With an ever-growing list of new alloys having special properties and intended for particular uses, the book should be of special use to engineers as a handy means for studying the analysis and characteristics of all of the known metals.

"Flame Cleaning and Dehydrating Iron and Steel." This is the title of an eight-page, illustrated booklet which is now being issued by Air Reduction, 60 East 42nd St., New York City.

The first part of the booklet is devoted to a reprint of a recent magazine article, "Maintenance Painting on the Golden Gate Bridge," written by R. G. Cone, engineer, Golden Gate Bridge and Highway District. The article discusses the various problems encountered in the task of keeping the huge bridge in proper condition, and what means were utilized to overcome these problems. Mr. Cone explains how Airco equipment was employed in flame cleaning and dehydrating operations.

Rounding out the booklet is the text

of a paper delivered by F. H. Frankland, chief engineer, American Institute of Steel Construction, at the annual meeting of the American Toll Bridge Association. In his message entitled, "The Cleaning and Painting of Bridge Steel," Mr. Frankland discusses the economy of efficient maintenance of steel structures, and the important part played by flame cleaning in this program.

Copies of this booklet, ADG-1073, may be obtained by writing to Air Reduction, 60 East 42nd St., New York City.

Hoffman Heavy Duty Vacuum Cleaning Equipment. A 16-page catalog describing ways and means for removing the menace of dust from fabrication and finishing operations is now being issued by United States Hoffman Machinery Corporation, 105 Fourth Ave., New York, N. Y. Hoffman equipment is said to provide rapid, thorough, and economical removal of dust hazards.

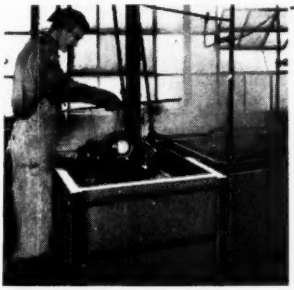
Illustrations in this catalog show installations of Hoffman equipment which were designed to meet the dust conditions existing in the plant. All dust and dirt is drawn into a nozzle provided with the equipment and conveyed through hose and pipe lines into dust separators. All the dust collected remains in the separators, which are located where they may be quickly emptied for final disposal of material.

Technical and Scientific Books. The new 1940 catalog of Important Technical and Scientific Books of the Chemical Publishing Co., Inc., 148 Lafayette St., New York, N. Y., contains many important new titles. Books of importance in all technical and scientific fields have been added to the previous standard and authoritative works.

A glance through this new catalog reveals books of interest to the layman, architect, pharmacist, chemist, engineer, metallurgist, advertiser, home gardener, farmer, technician, scientist, and so on.

A new innovation is the convenient check list printed on the outside cover which will insure that the catalog is passed on to those who are interested in new products, new methods and new uses.

A copy will be sent free upon request.



ASK FOR PERFORMANCE REPORTS
on Magnus 7 and 76 as well as other special cleaners for metal finishing operations.

Clean off Those Buffing and Polishing Compounds--
Thoroughly and Cheaply

The one sure way to insure better finishes and fewer rejects is to make sure of a good pre-cleaning job. Tripoli, crocus and other buffing and polishing compounds need the right kind of cleaner. You can do the job at mighty low cost and with assured results if you

USE MAGNUS 7 OR 76

For aluminum, there is no more effective cleaner than Magnus 7. For other metals, Magnus 76 is the answer.
They both emulsify the greases and waxes in polishing compounds, disperse the abrasives and fine metal particles on the metal surface. Both rinse off quickly and completely to give a bright film-free surface. If you want low costs and insured quality of finish, give these two Magnus special cleaners a thorough trial.

MAGNUS CHEMICAL COMPANY
Manufacturers of Cleaning Materials, Industrial Soaps, Metallic Soaps, Sulfonated Oils, Emulsifying Agents and Metal Working Lubricants.
208 SOUTH AVENUE **GARWOOD, N. J.**

MAGNUS CLEANERS

EXTINGUISHING PAINT FIRES AUTOMATICALLY

Carbon Dioxide Extinguishes Spray-Booth and Dip-Tank Fires Without Human Aid

By P. W. EBERHARDT
Walter Kidde and Company, Inc.

IN the industrial finishing field, the fire record centers almost entirely around the ignition of flammable liquids used in various coating operations. The causes of these painting fires break down as follows:

Electrical	43 per cent
Spontaneous Ignition,	25 per cent
Careless Operation	24 per cent
Miscellaneous	8 per cent

Elimination of these causes is largely a matter of care and adequate ventilation, and the main problem is to control the resulting liquid fires quickly and with minimum loss and interruption. Such liquid fires break out with a sudden, swift ignition which often renders plant crews incapable of concerted and intelligent action in fighting the blaze. Also, it often occurs in ovens or enclosures where it is impossible for employees to approach because of intense heat or other obstacles.

To combat these swift and vicious blazes, science has developed a fire-fighting technique that eliminates the human element entirely. It is an automatic gas smothering method that takes for granted that employees become panic-stricken when fire strikes, and therefore leaves nothing for them to do but retreat to safety.

The gas is carbon dioxide or "dry-ice" vapor, and it is stored under high pressure in steel cylinders at a point near the hazard. Heat sensitive detectors are located on ceilings above the hazard, and within a few seconds after fire breaks out, the valves on the cylinders are automatically opened. The carbon dioxide rushes out through a piping system and billows through nozzles into the room or enclosure where the fire is burning—smothering it in a few seconds. It functions by quickly cutting the oxygen content of the air to a point at which the liquid or vapor cannot burn. For example, most petroleum thinners require 16 or 17 per cent oxygen content in order to burn, and the carbon dioxide discharge quickly brings the oxygen content well below this combustion point.

In some plants, the coating processes are carried on in small rooms, and only a few cylinders of carbon dioxide are required to flood the entire enclosure. In other plants, where large areas can become contaminated with combustible fumes from low flash-point liquids, batteries of cylinders holding thousands of pounds of

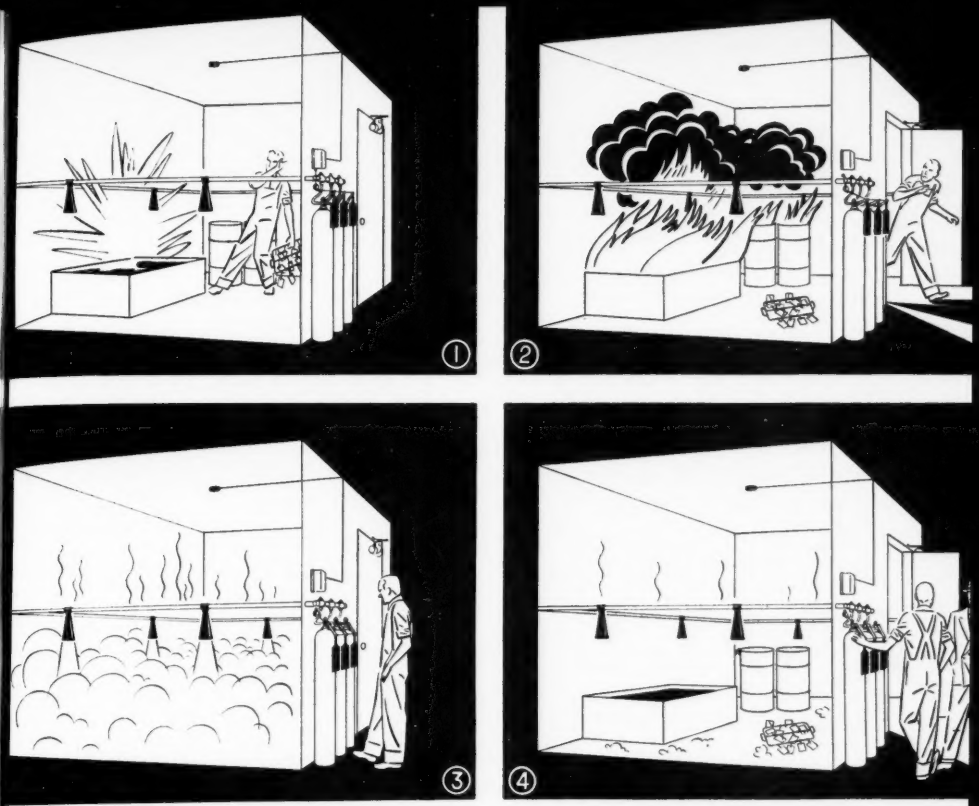


Illustration No. 1 shows a "flash fire" starting in a flammable liquid. No. 2—Instead of frantic scurrying for hose lines and alarm-boxes, the workman exits quietly from the burning room. By the time he is outside, the rapid temperature rise sets off the actuator on the ceiling. This automatically releases the valves on the carbon dioxide cylinders, in which the gas is stored at high pressure. No. 3—While the workman waits outside, the gas clouds billow from the nozzles, blanketing the floor and flooding the entire room evenly. The gas immediately reduces the oxygen content of the air in the room from its normal 21 per cent to 14 per cent or less—at which point fire cannot burn. Door- and window-closers prevent escape of the gas. No. 4—It's all over in twenty seconds. Ventilation is resumed and the non-toxic carbon dioxide dissipates, leaving liquids uncontaminated and making clean-up unnecessary. And, because it is a gas and three-dimensional in action, it penetrates through crevices and past obstructions wherever fire may burn.

the gas are used to cope with sudden flash fires which can spread with amazing swiftness from room to room. On dip-tanks and drainboards, it is possible to arrange the pipes and discharge nozzles so that the gas clouds envelop only the surface of the tank and drainboard where fire may break out. This latter method is known as "local application."

In rooms which are completely flooded with the carbon dioxide, automatic closing of doors and windows is necessary to prevent escape of the gas. This is done by trips in the gas piping, which retract pins when the carbon dioxide rushes through, thus releasing window and fire-door chains. It is also possible to make the released gas shut off electric motors and pumps in the room, and where wall openings and ducts cannot be closed,

screening nozzles are used to project jets of the gas across the opening, shutting off the oxygen supply as effectively as a door.

Some of the flammable liquids which cause so many industrial fires are gasoline, naphtha, benzol, turpentine, lacquer, enamel, and many other solvents and chemicals of carbon derivation. Some of them give off flammable fumes at normal temperatures, while others are most dangerous when heated. All of them burn fiercely when they ignite, and water streams can rarely be used to extinguish them. Incidentally, static and electrical sparks cause about half of these fires, and many a disastrous blaze can be traced to an employee who has a faculty for collecting static in his body. Such human "sparkplugs" need only pass near a metal object to cause a spark to jump—and a fire to break out.

Another advantage of carbon dioxide is its low cost: It is obtained from coke ovens and from other combustion processes. Also, it is non-toxic and does not harm human tissue or delicate materials, and quickly dissipates after a fire is smothered. Its greatest advantage in the finishing field, however, is its ability to pass around obstructions and into crevices where the fire may be burning.

"Basolit Pickling Tanks." This is the title of a very interesting illustrated catalog which is now being issued by Nukem Products Corp., 68 Niagara St., Buffalo, N. Y. Basolit tank construction is a combination of an outer shell, a layer of especially prepared Nukem asphalt cement, and an acid-proof brick lining jointed together with acid-proof cement Basolit. The outer shell is generally made of reinforced concrete and the lining of repressed deaired Toronto acid blocks.

An added feature is an outer shell made of rubber-lined steel. Special rubber sheathing has been developed for that purpose, vulcanized to the welded steel plate. This type of construction, combined with standard Basolit-Brick lining as a protection to the rubber against excessive temperatures and physical damage is said to be especially well adapted for use in the pickling industry.

Basolit tank construction is said to assure clean and spotless pickling. The pages of this catalog illustrate a few of the pickling tanks of this type which have been installed by Nukem Products Corp.

A copy of this catalog will be sent free upon request.

Wagner Air Circulation and Ventilation Bulletin. The Wagner Electric Corporation, 6400 Plymouth Avenue, St. Louis, Mo., is now issuing an 18-page bulletin on air circulating and ventilating equipment, containing a full description of where and how to use this type of equipment for both cooling and ventilating purposes. In addition to a general discussion on air circulation and ventilation, the bulletin illustrates the complete line of Wagner fans.

A copy will be sent free upon request.

Medart V-Belt Drive Catalog 88-L. The Medart Company, 3538 DeKalb St., St. Louis, Mo., announces the issuance of a new V-Belt Drive Catalog. This catalog shows new belt ratings of Medart V-Belt which permit more precise and economical selection of V-Drives.

Another feature of this catalog is that it has been prepared in simplified form. It requires but a fraction of the time to figure the correct belt and sheave combination from the data shown as compared to former methods. This simplified form eliminates complex mathematics and intricate engineering computation. It takes only simple arithmetic and a few minutes of time to determine the correct V-Belt Drive combination to fit any specific drive problem.

A copy of the Medart V-Belt Drive catalog can be obtained by writing The Medart Company, 3538 DeKalb St., St. Louis, Missouri.

Mention PRODUCTS FINISHING when writing to advertisers. Your cooperation will be appreciated both by the advertiser and this magazine.

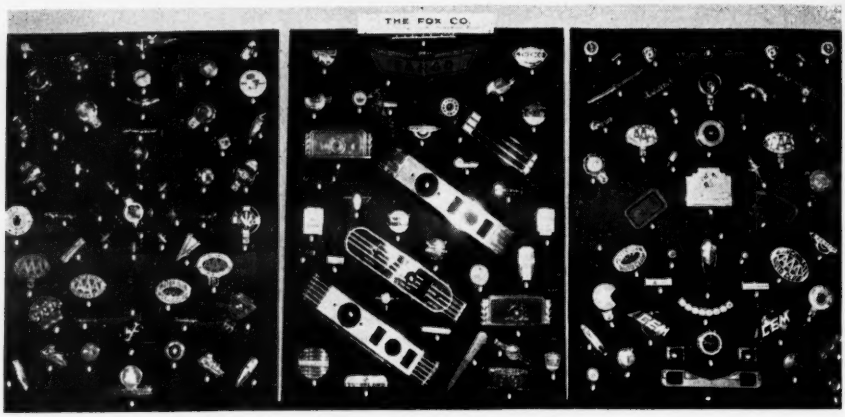
Acme Steel Co.
Ajax Flexible Coupling Co.
Allis-Chalmers Mfg. Co.
American Can Co.
American Chain & Cable
American Gas Furnace Co.
American Laundry Mach.
American Locomotive Co.
Anaconda Copper Mining
Anchor Post & Fence Co.
Appleton Electric Co.
Armstrong Machine Works
Atlas Lumnite Cement Co.
Atlas Powder Co.
Bakelite Corp.
Baldwin Belting & Leather
Baldwin-Duckworth Div.
Baldwin-Southwark Corp.
W. F. & John Barnes Co.
Bethlehem Steel Co.
Black & Decker Mfg. Co.
Blaw-Knox Co.
Brown & Sharpe Mfg. Co.
Bucyrus Erie Co.
Bullard Co.
Butler Mfg. Co.
Byers Machine Co.
Calco Chemical Co.
Canadian Ingersoll-Rand
Canadian Westinghouse Co., Ltd.
Carboloy Co., Inc.
Carrier Corp.
Carter Carburetor Co.
Celluloid Corp.
Century Electric Co.
A. B. Chance Co.
Chicago Bridge & Iron Co.
Chicago Molded Products
Cincinnati Bickford Tool Co.
Cincinnati Milling Machine Co.
Cincinnati Shaper Co.
Clark Controller Co.
Cling Surface Co.
Colgate-Palmolive-Peet Co.
A. M. Collins Mfg. Co.
Columbia Alkali Corp.
Combustion Engineering Co.
Continental-Diamond Fibre Co.
Copperweld Steel Co.
Cornell-Dubilier Elec. Corp.
Crown Cork & Seal Co.
Cuno Engineering Corp.
Cutler-Hammer Inc.
Detroit Rex Products Co.
Diehl Mfg. Co.
Ditzler Color Co.
Dodge Mfg. Corp.
Dole Valve Co.
Domestic Engineering Co.
Duff-Norton Mfg. Co.
DuPont Co.
Durez Plastics & Chemicals
Thomas A. Edison Co.
Ex-Cell-O Corp.
Fafnir Bearing Co.
Fairbanks Morse & Co.
Farrel-Birmingham Co., Inc.
Ferranti Electric, Ltd.
Flintkote Co.
Foote-Burt Co.
J. B. Ford Sales Co.
Foster Wheeler Corp.
Foxboro Co.
Frick Co.
Frontier Roller Bearing Co.
Fulton Syphon Co.
General Electric Co.
General Railway Signal Co.
Gisholt Machine Co.
Globe Steel Tubes Co.
B. F. Goodrich Co.
Gould Pumps, Inc.
Graver Tank & Mfg. Co.
Graybar Electric Co.
A. P. Green Fire Brick Co.
Guardian Electric Mfg. Co.
Hamilton Mfg. Co.
Hays Corp.
Heald Machine Co.
Hinde & Dauch Paper Co.
Hercules Powder Co.
Hevi Duty Electric Co.
Hilo Varnish Corp.
Hotstream Heater Co.
Hyatt Bearings Div.
Hygrade Sylvania Corp.
Independent Pneumatic Tool Co.
Ingersoll-Rand Co.
Insley Mfg. Corp.
International Nickel Co.
Irvington Varnish & Res.
Johnston & Johnston, Inc.
Johns-Manville Co.
Joy Mfg. Co.
Keasby & Mattison Co.
Koehring Co.
Lamson & Sessions Co.
Landis Tool Co.
R. K. LeBlond Machine Tool Co.
R. G. LeTourneau, Inc.
Lignum-Vitae Products Corp.
Lindberg Engineering Co.
Link-Belt Co.
Locke Insulator Co.
Magnus Chemical Co.
Manhattan Rubber Mfg. Div.
Mason-Neilan Regulator Co.
Mattheson Alkali Works
Mattison Machine Works
Milcor Steel Co.
Mono Service Co.
Monsanto Chemical Co.
Morganite Brush Co.
Morse Chain Co.
National Automatic Tool Co.
National Carbon Co., Inc.
National Process Co.
Nation Vulcanized Fibre Co.
Neptune Meter Co.
New England Coke Co.
New Jersey Zinc Co.
N.Y. Belting & Packing Co.
Nicholson File Co.
Northern Electric Co., Ltd.
Norton Co.
Novo Engine Co.
Ohio Brass Co.
Okonite Co.
Osburn Mfg. Co.
Otis Elevator Co.
Owens-Corning Fiberglas Corp.
Owens-Illinois Glass Co.
Pangborn Corp.
Pennsylvania Salt Mfg. Co.
Permutit Co.
Philadelphia Quartz Co.
Pittsburgh Equitable Meter
Pittsburgh Reflector Co.
Pneumatic Scale Corp.,
Read Machinery Co., Inc.
Reeves Pulley Co.
Reliance Elec. & Eng.
Republic Bank Note Co.
Republic Flow Meters Co.
Republic Steel Corp.
Resmans Prod. & Chem. Co.
R. W. Rhoades Metaline Co., Inc.
Robins Conveying Belt Co.
Rockbestos Products Corp.
John A. Roebling's Sons Co.
Rotor Tool Co.
Joseph T. Ryerson & Son, Inc.
S K F Industries, Inc.
Sangamo Electric Co.
Scott Paper Co.
Shepard Mills Crane & Hoist
Simonds Saw & Steel Co.
Sloan Valve Co.
W. W. Sly Mfg. Co.
Stanley Works
Superheater Co.
Surface Combustion Corp.
Taylor Instrument Co.
Thermoid Co.
Thew Shovel Co.
Timken-Detroit Axle Co.
Timken Roller Bearing Co.
Truscon Steel Co.
Union Carbide Co.
Union Steel Products Co.
Unitcast Corp.
U. S. Pipe & Foundry Co.
U. S. Rubber Co.
U. S. Steel Corp.
Edward Valve & Mfg. Co.
Vickers, Inc.
Edward W. Voss Machinery Co.
Wagner Electric Corp.
Walton Truck Co.
Warner & Swasey Co.
Waukesha Motor Co.
West Disinfecting Co.
West Elec. Instrument Corp.
West Penn Power Co.
Western Precipitation Corp.
Westinghouse Elec. & Mfg.
Weyerhaeuser Sales Co.
Wheeler Reflector Co.
Wickwire Spencer Steel Co.
Edwin L. Wiegand Co.
Wilson Chemical Instr. Co.
Wiremold Co.
Wolverine Tube Co.
York Ice Machinery Corp.

Who finds it pays?

These are some of the 845 companies that sent representatives to the national N. I. A. A. Conference last year . . . to take part in group discussions of marketing problems . . . present case studies . . . and study the advertising methods of industrial leaders.

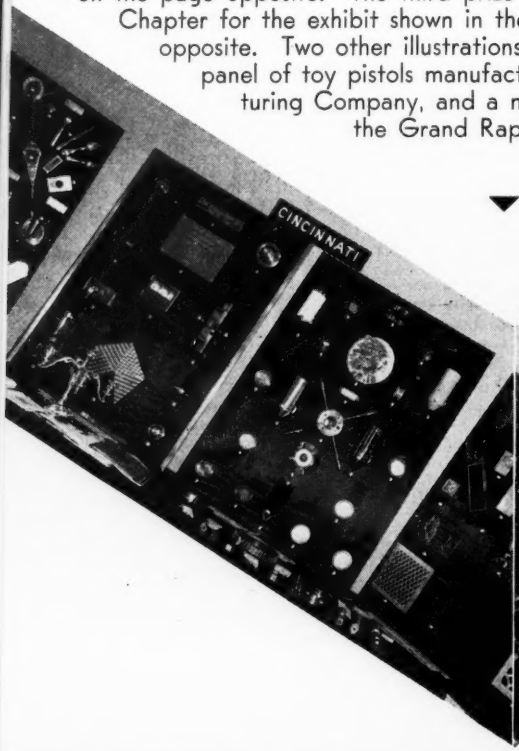
You are invited to the 18th annual Conference of industrial sales promotion and advertising executives in Detroit next September . . . to get new ideas and information that will make your 1941 program more effective, more profitable. Write now for details.

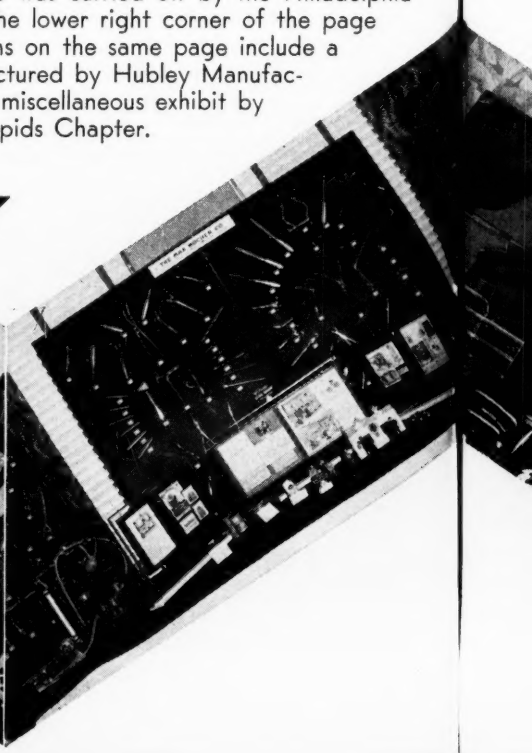
18th Annual CONFERENCE *and Exposition*
National INDUSTRIAL ADVERTISERS *Association*
SEPT. 18, 19, 20 . . . DETROIT . . . HOTEL STATLER

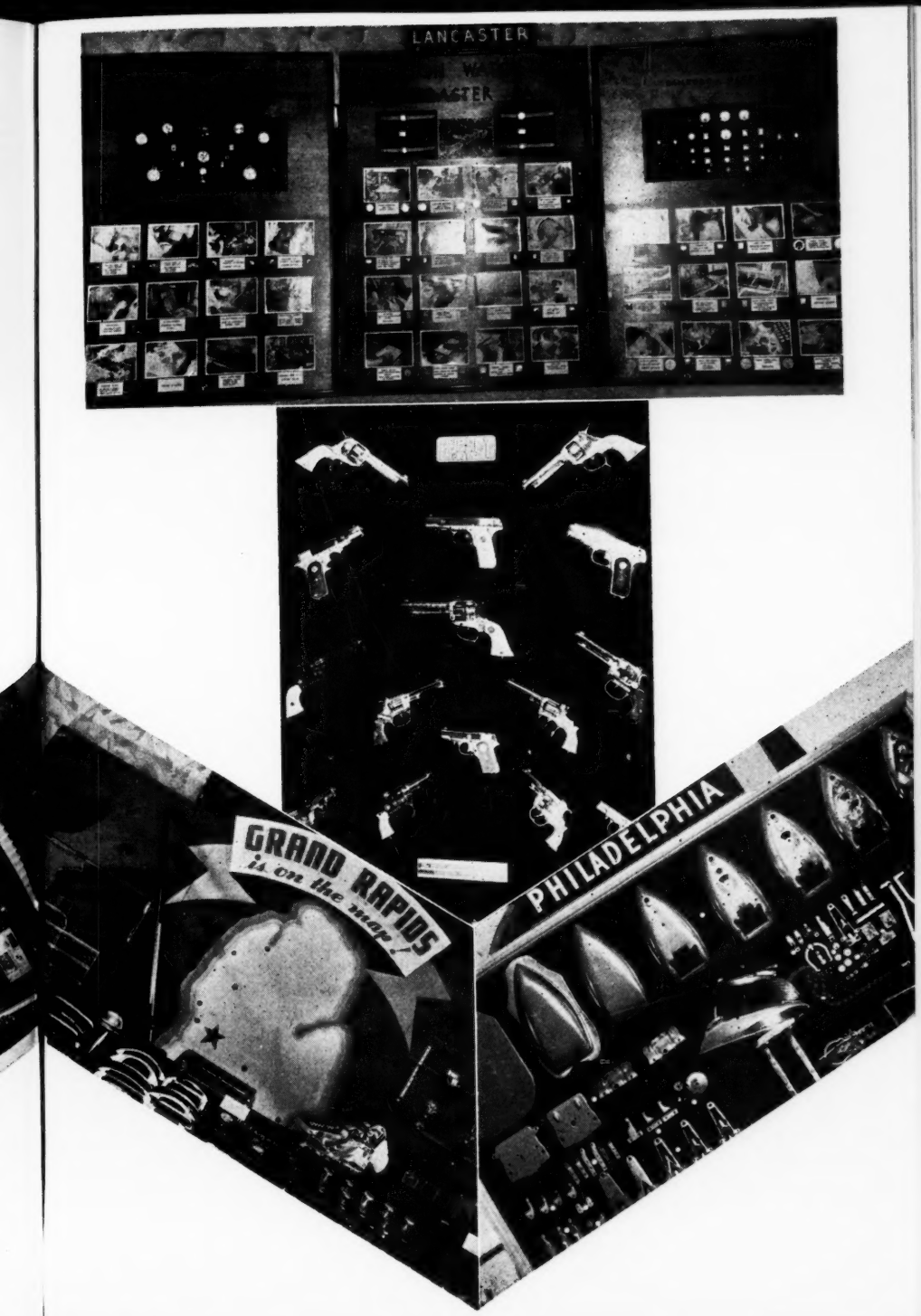


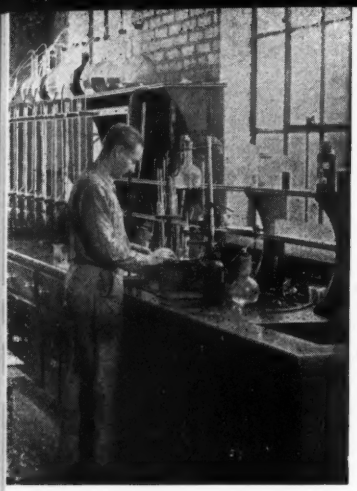
Exhibits at American Electroplaters' Society Convention

THE illustrations on this page show portions of the Prize winning exhibit submitted by the Cincinnati Chapter of the American Electroplaters' Society. In recognition of manner in which the Cincinnati Chapter fulfilled the exhibition requirements, this chapter was presented with the first prize cup. Running a very close second was the Lancaster exhibit shown at the top on the page opposite. The third prize was carried off by the Philadelphia Chapter for the exhibit shown in the lower right corner of the page opposite. Two other illustrations on the same page include a panel of toy pistols manufactured by Hubley Manufacturing Company, and a miscellaneous exhibit by the Grand Rapids Chapter.






LANCASTER
GRAND RAPIDS
is on the map!
PHILADELPHIA



THE Finishing FORUM

Painted Porcelain-Enamel on Iron

By Bernard H. Porter

TECHNICAL research carried out recently by consulting paint chemists and porcelain processers has developed a method of painting porcelain-enamel for sheet iron. Surfaces so decorated by competent artists and treated by metal finishers offers many possibilities. The architectural adornment, for example, of buildings, subways, offices, and homes is already feasible, while the production of a distinctive class of porcelain-metal ware is pending.

Past industrial methods of decorating or lettering enameled sheets employ aqueous mediums and colors that require individual firing. In these techniques the color of the dry powder or the later dried film have little relation to the final effect, thereby limiting any free expression of art and producing only mechanical results.

The present technique, on the other hand, offers opportunity for full aesthetic treatment with ample provision for changes in both design and color before firing. Powdered enamel pigments mixed with oil are applied directly to pre-treated metal sheets. The colors and general effect of the final firing do not differ appreciably from those the artists apply and any existing transposition from the palette of vitreous paint to the completed whole is learned readily and re-adapted. Unlike fresco work, which the artist builds up layer on layer before painting and which he destroys or rebuilds in making corrections, this technique is more flexible and adaptable to the mode of working. Once the combined colors are fused to the base in one heat operation, the artist's design or picture assumes both a depth and vitreous quality that lends itself admirably to murals and other types of architectural decoration. Obviously, the fired surface eliminates future disfigurement through cracking, blistering, and chemical change. Moreover, the enameled iron is not only impervious to moisture, dirt, vibration, temperature variation, and other elements that would ruin less stable media under similar conditions, but it is also capable of withstanding the

(Continued on page 55)

No. 17 Salt Water Test

Determination of the resistance of an organic finish to salt water immersion.

APPARATUS: Ten per cent solution (by weight) of common salt, container, thermometer.

PROCEDURE: Completely finish the panel so that no bare metal is exposed. After aging twenty-four hours, immerse the panel in salt solution to a depth of two inches. Maintain the solution at one hundred degrees Fahrenheit. Allow the panel to remain immersed until breakdown occurs, making daily inspections after washing off the panel in fresh water. The salt concentration, aging period and temperature may be varied to suit individual requirements.

CONCLUSIONS: The time for film breakdown, bubbling, appearance of rust, etc., is indicative of the resistance of the finish to salt water immersion.

No. 18 Chlorine Test

Determination of the resistance of an organic finish to chlorine gas.

APPARATUS: Chlorine gas, air-tight box fitted with door, gas inlet and vertical panel rack, thermometer.

PROCEDURE: Completely finish the panel so that no bare metal is exposed. After aging twenty-four hours, place the panel in the box and admit about ten per cent by volume of chlorine gas. Maintain the temperature in the box at one hundred degrees Fahrenheit. Allow the panel to remain in the box until breakdown occurs, making daily inspections. The chlorine gas concentration, aging period and temperature may be varied to suit particular requirements.

CONCLUSIONS: The time for change in color and gloss and for film breakdown is indicative of the resistance of the finish to chlorine gas.

No. 19 Hydrogen Sulphide Test

Determination of the resistance of an organic finish to hydrogen sulphide gas.

APPARATUS: Hydrogen sulphide gas, air-tight box fitted with door, gas inlet and vertical panel rack, thermometer.

PROCEDURE: Completely finish the panel so that no bare metal is exposed. After aging twenty-four hours, place the panel in the box and admit about ten per cent by volume of hydrogen sulphide gas. Maintain the temperature in the box at one hundred degrees Fahrenheit. Allow the panel to remain in the box until breakdown occurs, making daily inspections. The hydrogen sulphide gas concentration, aging period and temperature may be varied to suit particular requirements.

CONCLUSIONS: The time for change in color and gloss and for film breakdown is indicative of the resistance of the finish to hydrogen sulphide gas.

No. 20 Sulphur Dioxide Test

Determination of the resistance of an organic finish to sulphur dioxide gas.

APPARATUS: Sulphur dioxide gas, air-tight box fitted with door, gas inlet and vertical panel rack, thermometer.

PROCEDURE: Completely finish the panel so that no bare metal is exposed. After aging twenty-four hours, place the panel in the box and admit about ten per cent by volume of sulphur dioxide gas. Maintain the temperature in the box at one hundred degrees Fahrenheit. Allow the panel to remain in the box until breakdown occurs, making daily inspections. The sulphur dioxide gas concentration, aging period and temperature may be varied to suit particular requirements.

CONCLUSIONS: The time for change in color and for film breakdown is indicative of the resistance of the finish to sulphur dioxide gas.

(Continued from page 53)

assaults of individuals who adorn public walls with pencilled notes and drawings.

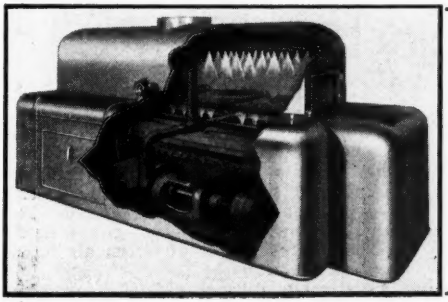
The enameling iron is made especially for the purpose in several thicknesses. Although the metal is available commercially in sheets up to 3½ by 8 feet, experienced technicians recommend units three feet square as the maximum size for murals. The sheets can be cut, bent, or embossed. When the edges are flanged, several 3 ft. x 3 ft. pieces can be joined to create decorations of large proportions. Copper could be used as the base metal, but experiments show iron to be stronger for the purpose. When enameled well, moreover, the iron does not rust.

In pre-heating the metal, processers spray on a cobaltous and water mixture that provides a dark surface of the desired properties. The coated metal is then placed for 2 to 3 minutes in a furnace operating at 1,560-1,600 deg. F. to produce the complete bonding of the metal and its film. Two white cover coats of porcelain follow.

The porcelain base is composed of the usual refractories and fluxes: cryolite, feldspare, fluorspar, and so on. The color oxides include several inorganic materials like cobalt, cadmium, selenium, and titinium. These are melted together at about 2,500 deg. F., and after the usual plunging in water to form powders for the enameling base, are further ground by the artists with a muller to permit partial dispersion in the special oil which long research shows is proper for the application. When the artist's painting is finished, a final firing dries out the oil and fuses the pigments with the two cover coats and the pretreated metal base. No running or lateral spread of colors result from kiln temperatures in excess of 1,500 deg. F.

New developments in durable enamels providing a mat or flat finish are now being investigated. Meanwhile, trial sketches and fired pieces made by well-known artists in cooperation with experienced enamel technicians are being exhibited in the Museum of Modern Art at New York City.

Basically there may be nothing radically new about the process, as enamels have been applied to objects for aesthetic reasons in the past. Its proposed adoption, however, in the wider commercial fields of interior mural decoration, exterior architectural adornment, and home objects of art is worth the attention of the metal-finishing industry. This is particularly true in view of these recent developments.



HYDRO-FLOW
Industrial Washing Machines

Streamlined design. Hidden motors, pumps and pipes are easily assembled. Piping and nozzles located to insure thorough cleansing of all surfaces. Rugged and efficient pressure pump. Corrosion resistant spray nozzles — from mist to open stream. Monorail. Belt or Gravity type conveyors designed to carry any shape or size material. Variable speeds on conveyor drive synchronize production.

Write for circular.

International Conveyor & Washer Corp.
640 E. FORT ST. DETROIT, MICH.

News OF THE INDUSTRY

Metal Finishing Firm Expands

Henry Nelkin, Inc., electro - platers and polishers, 128 Mott St., New York City, have once again expanded their business. They have added another floor to their plant and installed two new departments: Baking and enameling, and tumbling.

The baking and enameling department includes two 10 ft. x 10 ft. x 8 ft. baking ovens and three smaller ovens. The increased floor space has permitted the installation of the most modern methods of production for all types of sprayed, baked and synthetic finishes on their customers' products.

The tumbling department includes six new cadmium plating barrels, six modern nickel tumbling barrels, and four of the latest model burnishing barrels. Their specialties are lamps and lighting fixtures, photographic parts, as well as all types of beauty parlor equipment.

James C. Morgan Promoted by Yale & Towne

The Yale & Towne Mfg. Co., 4532 Tacony St., Philadelphia, Pa., manufacturers of the world-famous Yale locks, hardware and materials handling equipment, have just announced the promotion of James C. Morgan from his former post of general sales manager of the Philadelphia Division to the position of general manager of the entire Philadelphia plant.

Mr. Morgan first became associated with The Yale & Towne Mfg. Co. in 1920 when he came to Stamford from the C. B. Hunt Company to take charge of Yale's electric truck sales.

Due to his operating acumen, these so increased that the electric truck and

James C. Morgan

hoist divisions were combined into one unit under his supervision. It was while in this position that he laid the groundwork for the manufacturing and sales methods that have made The Yale & Towne Mfg. Co. the world's largest manufacturer of materials handling equipment.

As a reward for his fine record, Mr.

Morgan was made assistant to the president, which position he held until various factors made it obvious that his knowledge was needed to guide the materials handling destinies of the company. Taking charge of this division again, Mr. Morgan built it so successfully that nine years ago it became too large to be handled in Stamford, and moved to the large Philadelphia plant it occupies today.

Oakite's Detroit and Chicago Divisions Meet

Forty-six field service representatives from ten different states comprising the Detroit and Midwestern and Chicago and Southwestern divisions of Oakite Products, Inc., 20 Thames St., New York, N. Y., recently held their regular Annual Technical Sales Conference at the Lake Shore Athletic Club in Chicago.

Discussions during the two-day conference revealed the fact that in view of the greatly increased activity of metal-working plants throughout the country, part of which is attributed to educational orders being placed by the Government, production executives are showing increased interest in newly developed Oakite cleaning materials and methods which help to speed up production.

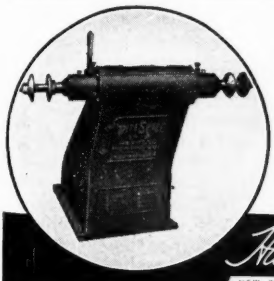
Lawrence V. Nagle Elected Vice President of The Udylite Corporation

At the annual directors' and stockholders' meeting of The Udylite Corporation, 1653 East Grand Blvd., Detroit, Mich., manufacturers of electroplating and polishing equipment and supplies, the directors of the Corporation elected

Lawrence V. Nagle Elected Vice President of The Udylite Corporation

Lawrence V. Nagle, vice president. Other officials reelected are as follows: Charles Awkerman, board chairman; L. K. Lindahl, president; C. H. Reeme, vice president and treasurer; Horace S. Maynard, secretary; A. L. Barak, assistant treasurer; John C. Moons, assistant secretary.

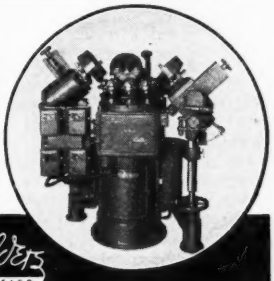
Mr. Nagle graduated from the Commerce and Finance Department of the University of Detroit in 1926. He joined the Udylite Corporation in 1932 after having been associated with several firms in a selling capacity. In 1937 he was appointed district sales manager of the Detroit area. Mr. Nagle will continue to direct sales in the Detroit district for The Udylite Corporation.



HAMMOND of KALAMAZOO
POLISHING MACHINES

POLISHING LATHES ★ . . . Ask for Catalog No. 10.

AUTOMATICS ★ . . . Rotary and Strait-Line. Send samples for prices and approximate production figures.



Hammond Machinery Builders INCORPORATED
NEW YORK 1622 Douglas Ave., KALAMAZOO, MICH. CHICAGO

Lawson Forms New Company

William B. Lawson, formerly of The Harshaw Chemical Company and The International Nickel Company, announces the formation of W. B. Lawson, Inc., dealing in industrial chemicals, oils, and non-ferrous metals. Offices are in the Union Commerce Building, Cleveland, Ohio.

Mr. Lawson joined the Harshaw organization in 1930 and resigned on January 25th, this year. Previous to joining that company, Mr. Lawson was for many years with The International Nickel Company, holding various executive positions. When he resigned from International in 1930 he was Director of Sales, which position he had held for several years.

According to Mr. Lawson, President, the new company offers a personalized buying and selling service based on his years' of experience, his broad contacts in chemical and metal trades and a highly specialized knowledge of many markets.

Jessop Steel Completes Electroplating Department

The Jessop Steel Co., Washington, Pa., manufacturers of special and alloy steels, announces the completion of a new building where electroplating and arc welding equipment used in the production of composite steels will be installed.

The new building is constructed of Robertson sheet metal which has an aluminum finish on the inside to provide superior lighting. It is fully insulated throughout and is equipped with a modern ventilating system for the protection and comfort of workmen. The building was completed in March, 1940.

Leeds Becomes Board Chairman of Leeds & Northrup

Morris E. Leeds, founder and president of the Leeds & Northrup Company, 4911 Stenton Ave., Philadelphia, Pa., is assuming the position of Chairman of the Board of Directors, and Charles S. Redding, Vice-President in Charge of Research and Engineering, becomes President, in an expansion of the company's executive set-up effective July 10th. Chairman of the Board is a post newly created to facilitate Mr. Leeds' participation in policy matters with which he will continue active.

This promotes to the presidency of the company one who has spent with it almost his entire business life. Mr. Redding took his first position with Morris E. Leeds & Company, predecessor of the present firm, for 15 months between high school and college. Receiving a B.S. in E.E. from the University of Pennsylvania in 1906, he spent two years as instructor in mechanical engineering there, and was briefly associated with the Engineers Club of Philadelphia. He rejoined the company in 1909, by which time it had become Leeds & Northrup Company, and has since held executive positions in every division of its activities. He became second vice-president in 1918, was treasurer from 1922 to 1924, and became vice-president in charge of research and engineering in 1928.

Mr. Redding is a director of the Philadelphia Manufacturers' Mutual Fire Insurance Company, and a member of American Physical Society, Franklin Institute, A.I.E.E., and American Association for Advancement of Science. He has served the Community Fund of Philadelphia and vicinity as a director, and has other avocations in public welfare.

Increase in New Wrinkle Licensees

The increasing demand for wrinkle finishes by product finishers has resulted in a number of new firms taking out manufacturing and sales licenses under New Wrinkle, Inc., Mutual Home Bldg., Dayton, Ohio, since January 1st.

The following list of firms represent the largest increase in licensees for any similar period except that immediately following the organization of New Wrinkle, Inc., at which time a majority of its licensees was secured: American Lacquer Solvents Co., Phoenixville, Pa.; Yarnell Paint Co., Philadelphia, Pa.; New England Lacquer Co., Providence, R. I.; The Boydell Bros. White Lead & Color Co., Detroit, Mich.; V.E.P. Company, Detroit, Mich.; Leon Finch Ltd., Los Angeles, Calif.; American Asphalt Paint Co., Chicago, Ill.; Louisville Varnish Co., Louisville, Ky.; Fulghum and Co., Los Angeles, California.

Each is an expert in the application of wrinkle finish to a wide variety of products and can be relied upon for sound and helpful counsel.

David E. Jackman Retires

Following the annual meeting of the Firth-Sterling Steel Company, McKeesport, Pa., L. Gerald Firth, president, announced the retirement of David E. Jackman, 78, treasurer of the company since 1911. H. R. Huemme, of McKeesport, formerly assistant treasurer, was elected treasurer. Mr. Jackman will continue as a director of the company.

Prior to his association with Firth-Sterling, Mr. Jackman had been treasurer of Westinghouse Machine Company before it became a part of Westinghouse Electric. He had also held the office of treasurer of Pittsburgh and Montana Copper Company when it was absorbed by East Butte Copper Company.

George P. Needham Appointed Cowles Representative in Ohio

Colonel A. L. Mercer, president, and Mr. H. L. Trembicki, manager of the metal cleaner department of the Cowles Detergent Co., 10525 Carnegie Ave., Cleveland, Ohio, announce the appointment of Mr. George P. Needham as Cowles Metal Cleaner representative in the Ohio Territory.

Mr. Needham is well known in this territory, as he has been contacting industrial accounts throughout the state for the past several years. He is well qualified in both knowledge and experience to represent Cowles. Mr. Needham will work out of the main office of the company, in Cleveland, Ohio.

Young Appointed Adjunct Professor at Brooklyn Polytechnic Institute

At the regular meeting of the Corporation of the Polytechnic Institute of Brooklyn, on May 9th, Dr. C. B. F. Young was given the rank of Adjunct Professor of Chemical Engineering on the Associated Teaching Staff of the Institute.

Norton Announces Changes

George W. Person, of the Norton Company, sales engineering department, at Worcester, has been transferred to the St. Louis territory for special grinding wheel field service. He will assist the present representative, Arthur W. Cox, and co-operate with the several Norton distributors.

J. L. de Vou, Jr., and George L. Freeman, of Norton Company, Worcester, Mass., have been appointed field engineers of the Cleveland and Chicago districts respectively. Both Mr. de Vou and Mr. Freeman have had experience in the Norton laboratories and in the sales engineering department at Worcester, as well as field work in other districts.

William Paul Joins O. Hommel Company

An announcement has been made that William Paul is now associated with the O. Hommel Company, Inc., Hope St., Carnegie, Pa., as serviceman in the frit division.

Beginning his business career in 1921 with the Wolverine Porcelain Company, Mr. Paul later became affiliated with the Philadelphia Porcelain Company. Before

"MAGIC" TACK RAGS
IMPROVE YOUR FINISH 100%

MAGIC TACK RAGS remove specks, lint and sand particles--- bring out that deep, smooth luster, produce a faultless surface for white or colored finish. Why use "home made" tack rags when you can buy MAGIC TACK RAGS at trifling cost! They are tackier, do not dry--- are dust-proof and spontaneous combustion proof. Packed in dozen and gross lots or more. Made only by the

Wm. A. Juergens Co.
4036-40 Lagrange Street,
Toledo, Ohio, U. S. A.
If your dealer does not carry Magic Tack Rags, write us for sample.

joining the Hommel organization, he was employed as enameling superintendent for the Acme Porcelain Enameling Corporation. The friends of Mr. Paul extend their sincere wishes for success in his new position.

Harry N. Hayes Appointed General Sales Manager for Coffing Hoist Company

The Coffing Hoist Company, Danville, Ill., announces the appointment of Mr.

Harry N. Hayes

Harry N. Hayes to the position of general sales manager. Mr. Hayes has been with the Company for several years, during which time he acted in the capacity of district sales manager in various territories. Prior to his affiliation with the Coffing Hoist Company, Mr. Hayes had many years of engineering and selling experience.

Harner Appointed Service Engineer

Mr. Leo Harner, it was announced today by The Porcelain Enamel & Mfg. Co., Eastern and Pemco Aves., Baltimore, Md., has been appointed to act as service engineer in the California territory of that company.

Mr. Harner is a graduate of Ohio State University, where he specialized in ceramics. Upon his graduation he became associated with the porcelain enameling industry. For the past eight months he has been connected with Pemco in both technical and service capacities. The diversity of the experience gained through his various connections and through the knowledge of ceramic materials and processes especially qualifies him for his new position, which he will assume at once.

Zialite Corporation Moves to New Quarters

The Zialite Corporation, Mt. Vernon, N. Y., announces that it is moving to larger quarters at 143 Exchange St., Worcester, Mass., early in June. This move is being made so that the company may take better advantage of the services of its technical director, Dr. Ernest D. Wilson, who was recently appointed head of the chemical engineering and chemistry department of the Worcester Polytechnic Institute.

Lea Appointed Distributor for Aminco-Brenner Magne-Gage

The Lea Manufacturing Co., 14 Cherry St., Waterbury, Conn., has been appointed New England distributor for the Aminco-Brenner Magne-Gage, manufactured by the American Instrument Co., Silver Spring, Md. The Magne-Gage is an instrument for accurately and rapidly measuring local thicknesses of metallic or organic coatings on metal surfaces without destroying or injuring the coating or the base metal.

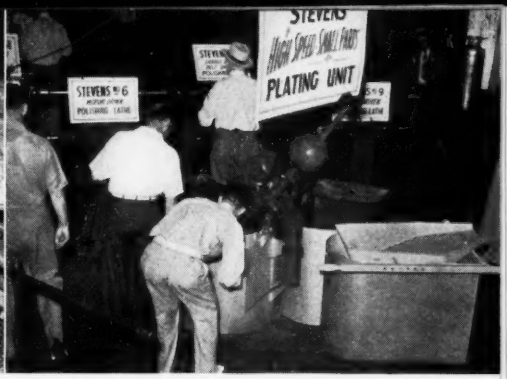
N. A. Strand Passes

N. A. Strand, partner, N. A. Strand & Company, 5001 North Wolcott Ave., Chicago, Ill., died at his home in Evanston, Ill., Wednesday, April 10th, after a long illness.

Mr. Strand had not been actively engaged in business for several years on account of poor health.

American Electro-Platers' Society Concludes Most Successful Convention

It was a great Convention! Without question, the twenty-eighth Annual Convention of the American Electro-Platers Society held at the Biltmore



These illustrations show only a part of the interested crowd at the Frederick B. Stevens Open House

Hotel, Dayton, Ohio, will go on record as being the most successful in the history of the Society. Four full days were spent listening to some of the industry's best known experts telling how they "do their stuff," to the necessary business sessions, and to plant visitations which were in themselves an education, besides which some of the golfing cronies got together on the greens and fairways and the Elbow Benders Club held their annual reunion. The Dayton Chapter of the AES was rewarded in its efforts to make this a "best ever" convention by registering a record breaking attendance of 609 members and guests.

Those attending the Convention were entertained by the Federick B. Stevens Inc. at an Open House at the Mitchell Engineering Company, Springfield, Ohio, and also at the Springfield Golf and Country Club. At the Mitchell plant, where refreshments were served to everyone, several pieces of Stevens equipment for the plating plant and department were shown. The accompanying illustrations show only a portion of the enthusiastic group which examined the equipment on display. A full automatic rack type plating machine, a full automatic basket type plating machine, high speed, small parts plating units, polishing and buffing lathes were among the pieces of equipment shown.

At the final business session, Mr. Frederick Fulforth, Superintendent of Finishing, Proctor Electric Company, was elected President of the Executive Society. Mr. Ellsworth T. Candee, Technical Supervisor, American Metal Hose Branch, American Brass Company, was named first vice-president. Mr. Nelson F. Sievering, superintendent of Plating, Philip Sievering, Inc., was elected second vice-president. Mr. Charles C. Conley, manager, Sidney, Ohio, plant, Stolle Corp., was named third vice-president. Also at this meeting, Boston, Mass., was selected as the next convention city.

Mention PRODUCTS FINISHING when writing to advertisers.

NOW...

S-310

RUST INHIBITIVE

Formulated specifically for the following properties:

1. Very fast air-drying
2. Water-whiteness
3. Tenacious adhesion
4. Hardness combined with flexibility

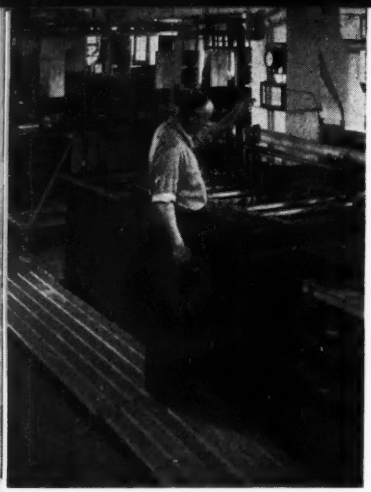
and

RUST RESISTANCE

S-310

is used and recommended as a clear coating for hand tools, machine tools, hardware and wherever a clear protective coat for bright metal is required.

The Varnish Products Co.
5208 Harvard Ave. Cleveland, Ohio



New PLANT EQUIPMENT AND Materials

A C P Rust-Proofer

A preparation which is said to stop rust under paint, prevent it from eating metal, and prolong the life of paint, to be known as "A C P Rust-Proofer," has been placed on the market by American Chemical Paint Company, Dept. 303, Ambler, Pennsylvania.

A C P Rust-Proofer is applied to metal surfaces by brushing, or with a spray gun, in as heavy a coating as will hold to a vertical surface. The chemical is allowed to air dry on the metal for four to twelve hours and then removed with water. When the rinsed surface is completely dry, it is ready to receive the first coat of paint.

A C P Rust-Proofer is available in gallon bottles, five and twelve gallon carboys, and forty-eight gallon rubber-lined barrels. One gallon of the material is said to treat 200 to 500 square feet of cleaned metal surface.

Trojan Spray Gun

A spray gun, to be known as the "Trojan," has been placed on the market by the Sharpe Manufacturing Company, 1224 Wall St., Los Angeles, Calif. This gun is said to be new in design, construction, and performance.

The Trojan can be used to spray lacquers, synthetics, lead and oil paints, varnishes, and so on. The pressure, volume, material width and atomization can be instantly adjusted for the particular finish required for the job. Individual air, fluid and width controls are provided at the operator's finger tips, thus permitting instant and minute settings to produce smooth, even finishes.

Of particular importance to the operator is the fact that the minute volume

Trojan Spray Gun

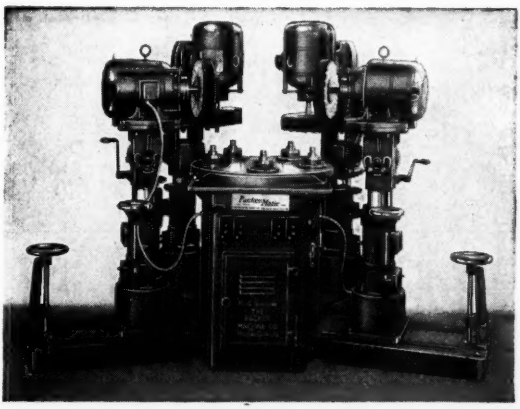
control makes it unnecessary to provide several spray heads to properly handle various forms of spraying materials. The spray widths range from more than 18 in. in width to less than ½ inch.

Pyronamel

An inorganic finish to be known as "Pyronamel" has been placed on the

Packer-Matic
Automatic
POLISHING & BUFFING MACHINES

Automobile Parts and Accessories manufacturers find Automatic Finishing on Packer-Matic steps up their production and cuts Finishing Room costs. Varied shapes and sizes, in all metals, are being more uniformily Finished, at a saving, on any one of three types of Packer-Matic—



- **Rotary**
- **Straight Line Conveyor**
- **Roll**

Cut Your Finishing Costs— Send sample Part and get a Time Study, gratis — WRITE "Time Study" Dept.

THE PACKER MACHINE CO. MERIDEN, CONN., U.S.A.

market by The Porcelain Enamel & Manufacturing Company, Eastern and Pemco Aves., Baltimore, Md. This finish has been developed for application on heating units and when applied to products of this type is said to make them fire-proof, rust-proof, and resistant to corrosive elements.

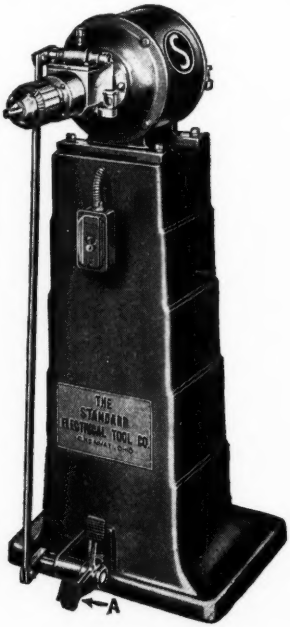
"Standard" Speed Lathe

Developed particularly for production service on small parts requiring polishing, countersinking, reaming, burring and filing, a speed lathe recently introduced by the Standard Electrical Tool Company, Eighth and Evans Sts., Cincinnati, Ohio, is said to be ideal for use in aeronautical, automotive, and industrial plants.

The outstanding feature of the machine is the clutch and brake arrangement for stopping the work spindle while the motor continues to operate. This unit was incorporated by the manufacturer with the thought of ensuring longer motor life, cooler operation, lower maintenance and current consumption, as well as better performance and increased production.

With the clutch and brake unit, the work spindle may be stopped for inspection of work as often as required, the clutch and brake being actuated simultaneously through foot pedal "A." Pressure on the forward foot pedal places the work spindle in operation; pressure on the rear foot pedal simultaneously disengages the clutch and applies the brake, instantly stopping the work spindle; slight pressure on the foot pedal places the spindle in neutral position, permitting the work to be revolved by hand for inspection. It is possible to secure a variation of this arrangement in that the clutch is engaged only as long as pressure is applied to the foot pedal.

The machine is available in a single



"Standard" Speed Lathe

speed only, but can be furnished in any speed required from 150 to 3,450 r.p.m. in sizes from ½ to 2 h.p. The most modern construction features are incorporated. Anti-friction bearings are

ALUMILITE

Rolled and Cast Aluminum shapes up to 25 feet in length finished by the anodic or alumilite process.

Architectural and aeronautical pieces a specialty. Write:

ALUMINUM FINISHING CORPORATION

1119 EAST 22nd STREET INDIANAPOLIS, IND.

used throughout. The clutch operates in oil, ensuring quiet and efficient operation. Regular equipment includes a Morse taper socket, but a drill chuck or universal lathe chuck can be furnished to order.

NFA and NASO Safety Goggles

NFA and NASO safety goggles can now be obtained direct from their manufacturer, the American Optical Company, Southbridge, Mass. Previously,

NFA and NASO Safety Goggles

these goggles were manufactured exclusively for the National Founders Association to be sold to members and customers as part of the association's service. However, the association has discontinued this practice and has notified its members that orders should be placed direct with the optical concern.

NFA and NASO safety goggles are made in 50 and 45.8 mm sizes and are said to provide complete comfort as well as all-around protection. They are equipped with pliable, snug-fitting leather masks, wire-screen ventilators around the eyecups, adjustable headbands, and can be supplied with Super Armorplate lenses for protection against impact or Calobar Super Armorplate lenses for glare and impact.

Colonial Chemodizing Solution and Process

The Colonial Alloys Company, Chemical Division, Philadelphia, Pa., has placed on the market a solution process to be known as Colonial Chemodizing. Colonial Chemodizing is said to provide a low cost, non-electrolytic, simplified method of producing a hard, smooth, tenacious, corrosion resistant, colorless and integrally fused surface on colalloy, aluminum and aluminum alloys.

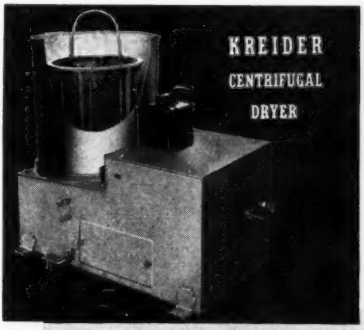
Chemodizing solution is furnished ready for the operator to mix with water. The process consists substantially of simple immersion. The use of heat in the process is optional and the time limit is not critical and may range from five minutes to twenty hours.

Besides being corrosion resistant, Chemodized metal surfaces are said to have excellent bases for paints, lacquers, and sealers.

Diamond Paint Conditioner

A paint conditioner for industrial paints has been placed on the market by the Diamond Iron Works, Inc., Minneapolis, Minn. The unit is built in two sizes: One for cans and buckets up to one gallon, and the other, from two to five gallons.

The Diamond Paint Conditioner operates on a reverse action principle and breaks up circulating currents by creating a powerful slushing effect that quickly conditions the finishing material. The motion mechanism is completely enclosed with a lubricant reservoir which provides splash lubrication to all bearings.



For Drying Plated Work and Lacquering Small Parts

One operator speeds up and improves production. Fast and economical.

All steel and electric welded. Fully enclosed ¾ H.P. motor. Reversing drum switch. Foot brake. V-belt drive. Basket rotates at 625 r.p.m. 32" x 18" floor space. Steam or gas unit heater optional equipment.

Write for details

DELLINGER MFG. CO.

729 N. PRINCE ST. • LANCASTER, PA.

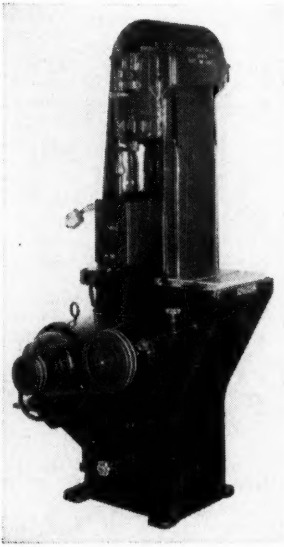
Diamond Paint Conditioner

The clamp mechanism is adjustable for the smallest size can, or small cans may be stacked under the clamp bar when more than one can is to be mixed. The conditioner is designed with shaft extensions on both sides so that it can be converted into a two-arm conditioner when desired.

The purpose of the conditioner is to thoroughly mix paint in cans or buckets. The Diamond Paint Conditioner is said to reduce mixing time and bring out the true color in a uniform mix ready for use or blending.

Porter-Cable Heavy-Duty Belt Grinder Model G-8

A heavy-duty belt grinder equipped for dry or wet grinding has been introduced by the Porter-Cable Machine Co., 300 Wolf St., Syracuse, N. Y. Designated as the Model G-8, the grinder can be operated at a range of speeds from 2,400 to 6,000 f.p.m. for use in grinding metals, plastics, ceramics, glass, rubber, and so on. It can also be used in squaring, cleaning, burring, facing, and polishing operations and for removing gates and flashing.



Porter-Cable Heavy-Duty Belt Grinder Model G-8

The Model G-8 grinder employs an exceptionally long belt—9 ft. in circumference. A belt of this length is said to reduce heat and to give more economical service. The belt width can be either 8 or 9 in. Built for heavy-duty service,

KING
PLATING BARRELS
PRODUCE
CLEANER, FASTER, SMOOTHER PLATING
A wood woven cylinder adaptable to any barrel plating tank.
Initial cost less than one-half.
There is no maintenance cost.
Stocked in sizes to fit your present tank.
Write for illustrated folder.
Use them once—you'll use them always
JOHN KING
48 SPRINGFIELD ST., DAYTON, OHIO

the grinder is equipped with large pulleys and heavy-duty special sealed bearings and is sturdily constructed.

Schauer Unit with Vacuum Chuck

Illustrated herewith is a Schauer Standard Speed Lathe equipped with a specially designed vacuum chuck in which work can be chucked without danger of scratching. The machine is a product of Schauer Machine Company, 2060 Reading Road, Cincinnati, Ohio. The chuck shown was designed especially for holding stainless steel bowls, 22 in. in diameter and 10 in. deep, so that the bowls could be polished to a mirror finish. Both the inside and outside surfaces of the piece are polished on one lathe, the vacuum chuck making it possible to chuck the piece, process it, and remove it with ease, speed, and precision and without running any risk of scratches or abrasion on the workpiece. The saving in time, elimination of spoilage, and improved quality of workmanship are accompanied by maximum safety for the lathe operator.

Schauer Speed Lathe Equipped with Vacuum Chuck for Holding Finely Finished Work While Polishing

The machine is provided with either single or two-speed motor, of 1 or 2 h.p. depending upon the work to be handled. An automatic braking system stops the motor in two seconds from high speed. A thermal switch and overload relay are standard equipment.

"Tred-Seal" Building Maintenance Material

An economical water-proofing, crack-filling, and splinter-proofing material for wood or concrete floors to be known as "Tred-Seal" has been placed on the market by Rock-Tred Company, Inc., 629 Washington Blvd., Chicago, Ill. This material, according to the manufacturer, provides a non-slip, dust-proof, long-wearing surface which acts as a floor preservative. It can be easily applied with a steel trowel and is said to be ready for heaviest service within six hours.

Outstanding advantages claimed for Tred-Seal include savings on maintenance and replacement on wood floors in warehouses, factories, elevators, and

THE ADIRONDACKS GORE MOUNTAIN CRYSTAL GARNET ORE

ABRASIVE GARNET

World's Standard for Over 60 Years
FOR
Abrasive Paper and Cloth
Grinding Wheels
Sand Blast
Lithographing
Non-Skid Surfaces
Wearing Surfaces
Ornamental Purposes
Minus 300 Mesh For Polishing

BARTON MINES CORPORATION
NORTH CREEK, WARREN COUNTY, N.Y.

trucks. The splinter-proofing of wood surfaces offers a safety feature stressed by the manufacturer along with low cost, since only a thin film of Tred-Seal is stated as being necessary to fulfill the requirements of a splinter-proofing operation. One gallon of material is said to cover approximately 75 square feet.

Brown & Sharpe Work Holding Fixtures

A magnetic work holding fixture designed for holding pieces during grinding, polishing, buffing, and so on, has been placed on the market by Brown & Sharpe Mfg. Co., Providence, R. I. The magnetic block is equipped with a knurled control wheel which, when turned to an on position, holds work firmly to the block. Work is released when the control wheel is in the off position. The block does not heat under any conditions and can be left on as long as desired without damage to work or block.

The block is made substantially and has only one movable part—the magnet. The magnet is made of a special alloy and is said to retain its power indefinitely. The working surface and the base of the block are ground parallel and the back end is ground square with the working surface.

Illustration showing B & S Magnetic Block in use for polishing small, flat workpieces

"Machine-Glazing" KNIVES
with
"Indian Brand" 4F Turkish Emery

(Photo Courtesy of W. R. Case & Sons Cutlery Co.)

24 blades are polished at once with 4F Turkish Emery at the W. R. Case & Sons Cutlery Company, Bradford, Pa.
Absolute uniformity, longer wear and prompt delivery. Write for *your* trial lot today.

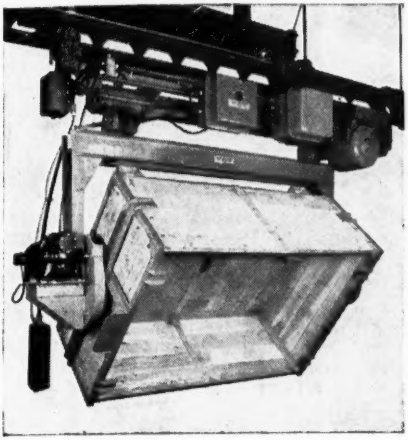
HAMILTON Emery & Corundum Co.
CHESTER • MASS.

Cleveland Tramrail Box Grab and Carrier

The Cleveland Tramrail Division of The Cleveland Crane & Engineering Co., Wickliffe, Ohio, has developed a full-rotation box grab and tramrail carrier for material handling. With the grab, boxes are turned to any desired position by means of a gear-motor drive. If desired, a complete turn can be made. This type of grab is especially desirable where gradual dumping is required. Through the use of a twin hoisting unit, boxes can be raised or lowered as desired. The boxes handled are firmly clamped in position by means of a handwheel located at the end opposite the gear-motor rotating mechanism.

The carrier shown herewith is designed to handle boxes 48 in. wide, 72 in. long and 30 in. deep and will carry 2,000 lbs. of materials. It has a full load hoisting speed of 20 ft. per minute and a travel speed of 150 ft. per minute. A push-button station is used for all operations including turning. Although the box shown with the unit is of wood, steel boxes are said to be handled with equal success.

The carrier is particularly adaptable for transporting boxes of material from storage to mixing machines. In this connection, several boxes may be used with one tramrail grab and carrier. The grab can also be used for handling crates, machines, and so on, which are to be turned or rolled over. Grabs can be furnished for small or large boxes and for loads up to 5 tons (including box, grab, and material).



Cleveland Tramrail Box Grab and Carrier

Dye-Crete

A material for coloring and dustproofing concrete floors to be known as "Dye-Crete" has been placed on the market by Wilbur & Williams Company, Park Square Building, Boston Mass. "Dye-Crete" is said to form a hard, firm, permanent coating over concrete and is resistant to the wear and tear of traffic as well as to attacks by alcohol, grease, oil, water, and dilute chemicals.

Treating floors with Dye-Crete requires a two-coat application. Dye-Crete stain, used as a first application, is applied to the surface and penetrates deeply to dye the concrete a uniform color and form a dustproof surface. Even as the surface wears, the color remains. The second application consists of a Dye-Crete varnish coating which is the same color as the stain. The varnish coating provides a hard finish and adds lustre to the color.

Dye-Crete is available in four attractive colors—club green, tile red, battleship grey, and chestnut brown.

Eclipse Type EX Extension Spray Gun

The Eclipse Air Brush Co., Inc., 300 Park Ave., Newark, N. J., has placed on the market an improved extension spray gun to be known as the "Type EX." The gun is designed for painting large surfaces beyond the natural reach of the operator without the use of scaffolding and staging. The operator stands on the floor and, since the extension gun is supplied in lengths up to 12 ft., can paint the average wall and ceiling without having to climb. The gun is also useful for painting large surfaces such as railroad cars and ship hulls. Surfaces below the level of the operator are said to be handled safely and equally as well with the extension gun equipment.

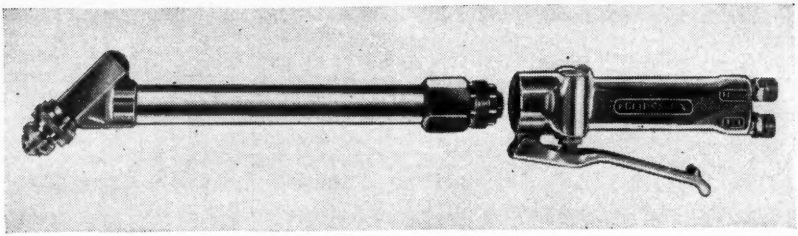
The Type EX extension has a de-

Borolon
TRADE MARK

First quality aluminum oxide abrasive grain manufactured in our own electric furnace plant under strictest standards of quality and uniformity. Available in four types (CT, T, B, TB), each of which is most efficient for polishing work within its field of application. Write for Abrasive Grain Data Sheet No. 1 giving complete details. Samples sent of grain sizes you specify.

POLISHING GRAIN

ABRASIVE COMPANY
Division of Simonds Saw and Steel Company
Tacony & Fraley Streets · Philadelphia, Pa.
Chicago Branch: 1624 South Western Ave.



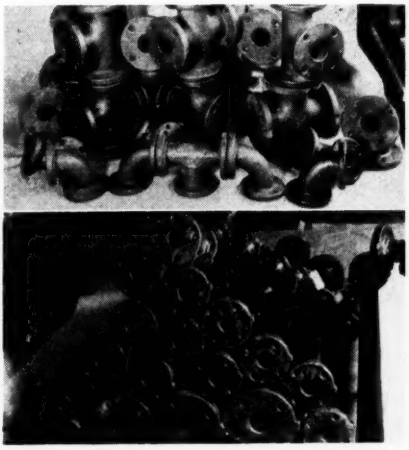
Eclipse Type EX Extension Spray Gun

tachable gun grip control, and different lengths of shaft can be used in the same grip. Shafts turn in the grip so that spray can be in any direction. The spray head is supplied in either of the two standard Eclipse models to insure the proper application of all types of materials.

Paramount SRL Pipe and Fittings

The accompanying illustration shows examples of rubber-insulated pipe and fittings that have been placed on the market by Paramount Rubber Service, Inc., 1430 Rosedale Court, Detroit, Mich. The pipe and fittings are designed for application wherever corrosive chemicals are used. All units to one foot in length are completely insulated inside and out, including flanges and bolt-holes. Longer lengths are given an application of Paramount rubber paint to the exterior surfaces back of the flanges.

The flange couplings of the SRL pipe and fittings are flexible; consequently, there can be no freezing of bolts in the rubber-lined holes. The rubber coating is built up from specially treated metal surfaces to the required thickness, with complete absence of seams and laps.



Paramount SRL Pipe and Fittings

WE RECOVER YOUR
SOLVENTS and THINNERS
from Sludge, Waste, Wash,
Spoiled Lacquers, etc.
AND SAVE YOU MONEY
Each shipment—one drum or a carload—receives
PROPER and SEPARATE TREATMENT.
Write to:
SOLVENTS RECOVERY SERVICE, Inc.
LISTER AVE. & BROWN ST., NEWARK, N. J.
or
HAMMOND CHEMICAL SERVICE, Inc.
241 BRUNSWICK ST., HAMMOND, IND.

For a real good polishing job use
KEYSTONE EMERY
TURKISH — NAXOS — AMERICAN
KEYSTONE EMERY MILLS *Write for Sample* 4316 Paul St., Phila, Pa.

Barrett-Cravens "Half Ton" Lift Truck

Designed for handling office and supply room materials and a wide variety of light weight items in industrial plants and warehouses requiring lift truck equipment lighter than that available heretofore, the Barrett-Cravens Co., 3250 W. 30th St., Chicago, Ill., has brought out the "Half Ton" lift truck shown

Barrett-Cravens "Half Ton" Lift Truck

herewith. This unit can be used as a combination lift truck with a full 2-in. lift for large loads handled on skids and as a floor truck for bulky, single objects such as barrels, cases, bales, tote boxes, small bins, and so on.

The Barrett-Cravens Half Ton Lift Truck is equipped with four ball bearing wheels, the front wheels being of the swivel type. The U-shaped tubular steel handle when pulled down to an angle of slightly more than 45 deg. lifts a loaded skid. The truck platform is lowered by means of a slight finger pull on the trigger chain. The truck is of rugged all-welded steel construction with ample structural reinforcements in the handle, chassis, and platform to eliminate distortion or sagging. Light in weight, the truck can be readily moved about even under capacity load and occupies a minimum of floor space when not in use.

Stan-O-Lead

A tin-lead alloy plating solution to be known as Stan-O-Lead has been placed on the market by Zialite Corporation. 117 N. Second Ave., Mt. Vernon, N. Y. This plating solution is said to plate a white, smooth alloy of about 60 per cent tin and 40 per cent lead and offers good corrosive resistance.

The Stan-O-Lead plating solution can be used for articles which must be soldered, such as small parts in the electrical and radio manufacturing fields. The solution operates at room temperature and at current densities up to 50 amperes per square foot. According to the manufacturer, this solution will maintain the proper ratio of tin and lead automatically.

Photoswitch Electronic Liquid Level Control

A liquid level control which is said to make possible automatic level control of liquids without the use of float switches has been placed on the market by Photoswitch Incorporated, 21 Chest-

TO MAKE PAINT STICK

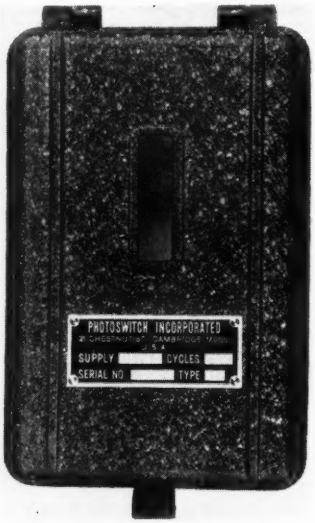
DEOXIDINE prepares metal surfaces perfectly for painting. Removes oil, rust, and rust stimulators. **GRANODINE** phosphate coats ferrous metals; bonds paint, and increases its life and protective effect. **LITHOFORM** phosphate coats zinc and cadmium and makes paint stick to the metal.

Write for Bulletins

AMERICAN CHEMICAL PAINT CO.

Dept. 303 • Ambler, Pa.

nut St., Cambridge, Mass. This unit is to be known as the "Photoswitch." The "Photoswitch" liquid level control is activated by a pair of probes which are



Photoswitch Electronic Liquid Level Control

placed in the liquid at the level where control is desired. When the liquid reaches this level, sufficient current passes through the liquid to actuate the pilot relay.

The electrical resistance between probes may be as high as 25 megohms. The maximum current passing through the actuating circuit of the pilot relay is three millionths of an ampere. The relay operates solenoid valves, pumps, and so on, to maintain constant liquid level.

Photoswitch liquid level control is extensively used in tanks of corrosive fluid, of liquid having high electrical resistance, in sanitary tanks, and so on.

RUST-I-CIDE "50"
Cleans, etches, and prepares metal for a perfect finishing job.
It can help your product.
RUSTICIDE PRODUCTS CO.
3125 Perkins Ave. • Cleveland, Ohio

Shaw-Box "Load Lifter Jr." Electric Hoists

Shaw-Box Crane & Hoist Division of Manning, Maxwell & Moore, Inc., 440 Broadway, Muskegon, Mich., announces the addition of two hoists—one of 500-lb. lifting capacity and the other of 1,000-lb. lifting capacity—to its "Load Lifter Jr." line of electric hoists. The hoists are of the low head room, wire rope and drum type and are built for heavy duty service. On both models, the hook in its highest position comes to within 12¼ in. of the bottom of the beam on which it travels. The hoists are available in lug suspension for bolting in place, hook suspension for hanging in place, or for use with a push-type ball bearing trolley for operating

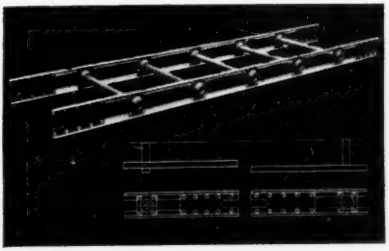
Shaw-Box "Load Lifter Jr." Electric Hoist

on either I-beams or special monorail track sections.

Features in the design and construction of the Shaw-Box "Load Lifter Jr." Electric Hoists are light weight (weight complete with trolley, 180 lbs.), forged steel gearing, the standard Shaw-Box two-gear reduction drive, and ball bearings throughout. They are supplied with either pendent cord or push button control for operation on either single phase or poly phase alternating currents.

Portable Aluminum Ladder

A portable aluminum sectional telescoping ladder, designed for general maintenance work around the plant, has been placed on the market by the Aluminum Ladder Co., 2nd Ave. and



Portable Aluminum Ladder

Wood St., Tarentum, Pa. Outstanding advantages of the new ladder are its light weight, great strength, and the fact that the sections are short enough to be carried readily in automobiles and light trucks.

The ladder illustrated is constructed in five sections, each six feet long. Total working length is 26 feet, and the weight is only 48 lbs. The sections are interchangeable, so that they may be used in any combinations up to five full sections. Space between rungs is 12 inches.

Other features of the new ladder are that it is rust-proof, non-sparking and easily-cleaned. Either steel spikes or rubber boots can be supplied for fitting over the bottom ends.

Buffalo Extinguisher

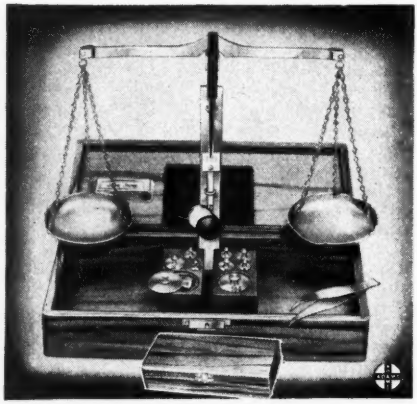
The Buffalo Fire Appliance Corp., 44 Central Ave., Buffalo, N. Y., has placed on the market two new fire extinguishers of the carbon tetrachloride vaporizing liquid type. These extinguishers are to be known as the Buffalo CTC one gallon and the Buffalo CTC two gallon pump type extinguishers. Both extinguishers are said to be particularly effective for protecting fire hazards around paint spray booths.

Buffalo Extinguisher

The Buffalo fire extinguishers are constructed with an extra heavy drawn brass seamless shell. The top and bottom sections are made of red brass castings. The pump is double acting and throws a continuous stream from 25 to 30 feet into the base of the blaze. There are no outside valves to shut off and the stream stops as soon as the pumping stops.

Clay-Adams Balance

A compact balance that can be readily dismounted and stored in a laboratory drawer has been announced by the Clay-Adams Company, 44 E. 23rd St.,



Clay-Adams Balance

New York, N. Y. This balance has been designed to meet the needs of all balance technique. It is supplied with brass weights.

In use, the upright beam support of the Clay-Adams Balance is inserted into a metal socket in a box and the beam placed upon it. An eccentric beam release enables the pans to be brought to rest. The capacity of the unit is 100 grams. The support beam is 7.25 in. long and has a steel knife edge. The support for the beam is an agate bearing. Pans for the balance are 3.25 in. in diameter and are notched to support test tubes.

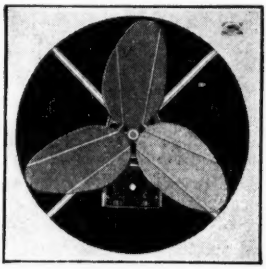
Galvaprep

A solution to be known as "Galvaprep," which is designed to properly treat and prepare various zinc surfaces so that the best and most enduring adhesion can be obtained between the zinc surfaces and the paint finishes, has been placed on the market by Neilson Chemical Co., 6564 Benson St., Detroit, Michigan.

Galvaprep is said to convert the ordinarily oily, greasy appearing surface of zinc into a hard, inert paint receptive base. The etching action of Galvaprep insures an ideal base to which both the coating and paint will bond firmly. This material is said to remove and neutralize all corrosive agents that are harmful or detrimental to the paint and which eventually contribute to the general breakdown of the finish.

Allvent Fan

An all-purpose fan which has been designated as the "Alvent" has been placed on the market by Autovent Fan & Blower Co., 1805 N. Kostner Ave., Chicago, Ill. The "Alvent" fan is said to be an all-purpose ventilating fan that



Allvent Fan

provides any normal required amount of air changes without objectionable noises.

Among the features of the Allvent fan is V-belt drive that provides slow, quiet operation and maximum efficiency with 1,750 r.p.m. motor.

A new design of the three-blade fan

GRINDING & BUFFING WHEELS
For Extraordinary SERVICE and ECONOMY

ATLANTIC WEKA CORP.
35 Wooster St.
New York, N. Y.

MANUFACTURERS OF
AWEKA
SPECIALTIES

wheel supplies or exhausts unusually large volumes of air at extremely low speeds. Large enough volumes of air are handled to provide a comfort-cooling job as well.

"Cadalyte." This is the title of a technical service manual describing "Cadalyte" salt for cadmium plating which is now being marketed by the R. & H. Chemicals Department of E. I. du Pont de Nemours & Company, Inc., Wilmington, Del. This manual contains full data for operations and maintenance of plating solutions, with cost and time tables on commercial deposits. Tests for deposit thickness are suggested, with notations describing equipment required. Control and methods of analysis are also covered.

Cadalyte is specifically designed to simplify the plating of cadmium metal, the manual points out. When used in the prescribed process, any type of cadmium plating can be produced economically over a wide range of operating conditions, it is explained. High strength solutions are recommended for high production rates and more dilute solutions for low-cost plating. Deposits of extreme brightness and uniformity can be obtained continuously. For maintenance, either of two products described in the manual may be used—Cadalyte brightener or Cadalyte maintenance compound. The addition of these materials is based on a simple titration for total sodium cyanide.

Copy will be sent free upon request.

Safety Clothing for Industry. A catalog of correctly designed safety clothing has just been issued by Industrial Gloves Corporation, makers of the famous Steel-Grip Safety Clothing line, 722 Garfield Blvd., Danville, Ill. This new and handsomely illustrated catalog features the most outstanding, widely used and approved industrial safeguards from a line of more than 3,800 items. It shows many of the latest time and money-saving ideas in gloves, mitts, finger guards, hand pads, sleeves, arm protectors, aprons, leggings, spats and welder's protective equipment. It demonstrates the profits that may accrue to you from the wise selection of safety garments designed especially for the individual demands of each job. It leads to a reduction in hospital and insurance expense, it shows how men can be kept at work, production flowing and morale high . . . through the choice of the correct safety clothing. A feature of the items shown in this catalog is that while each safeguard provides full protection it allows full freedom of movement for fast, sure handling of materials. Already many thoughtful executives have found this new catalog invaluable.

Copy free upon request.

Plastikon Catalog. A new catalog section on its line of Plastikon rubber putty, adaptable to many uses in building and industry has just been published by The B. F. Goodrich Company, Akron, Ohio.

The material is interesting to the metal trade because of its many applications under operating conditions where fumes or gases which destroy the properties of ordinary putty are present.

Plastikon is said to retain a degree of plasticity for long periods, does not harden, dry out or crack. It is water-

proof and maintains a seal against water more effectively than other materials.

The putty produces and maintains the air-tight and water-tight seal essential in many cases. It has great resistance to deteriorating effects of corrosive chemicals, chemical fumes and salt spray, adheres strongly and permanently to wood, steel and glass despite the action of sunlight, vibration or presence of corrosive chemicals and fumes. Severe climatic conditions effect no changes or deterioration over long periods.

Furnished in red, black, grey, green or gun metal, it is applied with putty knife or caulking gun. Any smears can be easily wiped off with kerosene or gasoline.

A copy of the Plastikon catalog will be sent free upon request.

Porcelain Enamel Colors and Color Matching. A color book, "Porcelain Enamel Colors and Color Matching," is now being issued by The Porcelain Enamel & Mfg. Co., Eastern and Pemco Aves., Baltimore, Md. This new book describes the method of matching a large number of colors with a small color inventory.

Porcelain Enamel Colors and Color Matching includes tables showing factors which affect color, and suggests simple devices to be employed in achieving good color matching results, shows three full pages of color samples, including 16 basic oxides, 22 blended, and 10 Bureau of Standards colors, known as kitchen and bathroom colors, determined through the collaboration of leading department stores, manufacturers, and the U. S. Bureau of Standards. The book also tells how 400 colors may be produced using only 16 basic oxides, and provides useful formulae for the purpose.

The book may be used by the color departments of manufacturers of refrigerators, washing machines, cabinet-sinks, sanitary ware, architectural porcelain enamel panels, kitchen ware, ceramic tile, and by jobbing plants. Architects, too, can use it to advantage in specifying porcelain enamel colors for building units. In addition to the text are illustrations showing the proper method to be used in viewing and matching colors.

Due to the cost of production, the initial edition is limited. For those who would like to have a copy of "Porcelain Enamel Colors and Color Matching" it may be obtained from The Porcelain Enamel & Mfg. Co., Baltimore, Md., for $1.00 per copy.

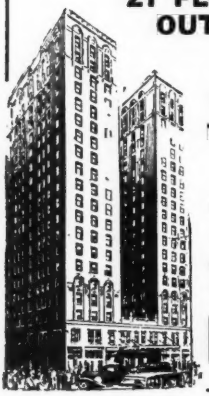
Good Cleaners for Good Plating. Bulletin No. C-104 describing a complete line of cleaners for removing greases, oils, polishing and buffing residues, and so on, from metal surfaces of all types, preparatory to plating and finishing, is now being issued by Hanson - Van Winkle - Munning Company, Matawan, N. J. The bulletin covers eight different cleaners and three soaps.

Copy free upon request.

"Lightnin" Laboratory Mixers Models "F," "V," and "L" are described in detail in an illustrated four-page catalog, designated as B-67, which has been released by the Mixing Equipment Co., Inc., 1038 Garson Ave., Rochester, N. Y. Complete specifications for each model mixer are listed.

Copy of Catalog B-67 free upon request.

HOTEL
BARLUM
Now One of the
ALBERT PICK HOTELS
21 FLOORS OF OUTSIDE ROOMS
EACH WITH COMBINATION TUB & SHOWER
FROM $2 DAILY SINGLE
CADILLAC SQUARE AT BATES ST.
DETROIT



Eclipse Catalog No. 77. The Eclipse Air Brush Company, Inc., 398 Park Ave., Newark, N. J., has just issued a catalog designated as the No. 77. This catalog is made up of 32 pages, 8½ by 11 in. in size, covering the complete line of Eclipse spray equipment for both manual and automatic operation. Included in this catalog is a section devoted to Pneumix air-motored agitators. A copy will be sent free upon request.

Mention PRODUCTS FINISHING when writing to advertisers.

OPPORTUNITY SECTION

FOR SALE
Guaranteed DeVilbiss Reconditioned Guns
Booths—Fans—Transformers
DeVilbiss Distributors
HOVEY SPRAY EQUIPMENT CO.
1509 Spring Garden St. Philadelphia, Pa.

Serving the Plating Industry
SCIENTIFIC CONTROL LABORATORIES
Consultant Platers-Chemists
COMPLETE Laboratory Service
20 cu. ft. Salt Spray
Trouble Correction Specialists
600 Blue Island Ave. CHICAGO

THIS Opportunity Section is available for classified advertisements featuring equipment, employment, business opportunities, etc., in the industries devoted to the cleaning, plating, polishing and finishing of metals. For advertising rates and other information address:

PRODUCTS FINISHING
431 Main Street • Cincinnati, Ohio

FOR SALE
Two (2) Model VS-800 Detrex Degreasers. Size VS-800 3'x5' complete with ¼ HP 220-Volt 60-Cycle 3-Phase motor and controls. Purchased new 1939 — excellent condition.
THE DURHAM MANUFACTURING CO.
MUNCIE INDIANA

BARGAIN
IN PLATING GENERATORS
1500/750 amp. 6/12 volt, 1100 rpm, Z.L.&L.
1000/500 amp. 6/12 volt, 1150 rpm, H.&V.W.
750/375 amp. 6/12 volt H. & V. W.
400/200 amp. 6/12 volt H. & V. W.
300 amp. 3 volt Elec. Prod. vertical motor drive.
200 amp. 7½ volt Hobart, motor drive.
200 amp. 6 volt Electric Products, motor drive.
150 amp. 6 volt Connecticut.
150/75 amp. 7½-15 volt Eager, motor drive.
50 amp. 6 volt Leland, single phase motor drive.
Plating generators Bought, Sold, Exchanged. *Write*
THE MOTOR REPAIR & MFG. CO.
1535 Hamilton Ave. Cleveland, Ohio

FOR YOUR *Catalog* LIBRARY

To obtain copies of the catalogs listed here, indicate on the coupon the number of the item in which you are interested and mail as directed.

1. A C P Rust-Proofer
A method for obtaining paint protection by means of a liquid chemical treatment designated as A C P Rust-Proofer is described in a folder which is now being issued by American Chemical Paint Company, Dept. 303, Ambler, Pa.

2. Nickel Steel Topics
Vol. 9, No. 3 of this publication which illustrates and describes many applications of nickel alloy steels is now being issued by the International Nickel Company, Inc., 67 Wall St., New York City.

3. Automatic Polishing and Buffing Machines
Complete information on polishing lathes, rotary and straight line automatics, is contained in a catalog which is now being issued by Hammond Machinery Builders, Inc., 1622 Douglas Ave., Kalamazoo, Michigan.

4. Panel Instruments
A catalog illustrating and describing Roller-Smith Company panel type three and four inch instruments is now being issued by Roller-Smith Company, 1766 W. Market St., Bethlehem, Pa.

5. Industrial pH Tester
A full range, glass electrode, acid or alkaline industrial pH tester is described in a catalog now being issued by Wilkens-Anderson Co., 111 N. Canal St., Chicago, Illinois.

6. Metal Cleaning Tips
The chemical classification and selection of alkaline metal cleaners is contained in a bulletin which has been prepared and is now being distributed by the Cowles Detergent Company, 10525 Carnegie Ave., Cleveland, Ohio.

7. Spray Booth Cleaners
Compounds which were developed to prevent the overspray of paint, lacquers, enamels, and other liquids from becoming bonded to the interior surfaces of spray booths are described in a folder which is now being issued by the Wayne Chemical Products Co., 9448 Copeland St., Detroit, Michigan.

8. Dust Control
A complete story of dust control in words and pictures by means of Roto-Clone dust control equipment is now being issued by American Air Filter Company, Inc., 700 Central Ave., Louisville, Ky.

9. Pentrate As a Permanent Product Finish
An attractive four-page catalog describing the Pentrate process of metal-finishing is now being issued by Heatbath Corporation, 242 Westfield Ave., Springfield, Massachusetts.

10. Keeping Plating Solutions Clean
A new approach to the problem of keeping plating solutions clean by means of "Hy-Speed" plating filters is described in a catalog which is now being issued by Alsop Engineering Corporation, Milldale, Connecticut.

---

11. Learok Buffing Compound
A bulletin containing notes on the use of Learok, a fast-working buffing compound with no free grease, is now being issued by The Lea Mfg. Co., 14 Cherry Ave., Waterbury, Connecticut.

---

12. Analysis of Plating Solutions
The fifth edition of this booklet describing simple methods of analyzing plating solutions is now being issued by Hanson-Van Winkle - Munning Co., Matawan, New Jersey.

---

13. Fluorescent Industrial Lamps
One of the most complete lines of fluorescent lamps manufactured is described in a catalog which is now being issued by Van Dyke Industries, 2857 S. Halsted St., Chicago, Illinois.

---

14. Truflo Wall Fans
Four and six-blade propeller type wall fans are featured in a four-page folder now being issued by Truflo Fan Company, Harmony, Pennsylvania.

15. Airway Ventilated Buffs
Cool cutting buffs for high speed buffing operations are illustrated and described in a 4-page folder now being distributed by Jackson Buff Corporation, 21-03 41st Ave., Long Island City, New York.

---

16. Paper Masking Tape
A masking tape that is highly resistant to lacquers, paints, and solvents is described in this folder now being issued by Industrial Tape Corporation, New Brunswick, New Jersey.

---

17. Modern Electroplating Control
Modern electroplating control with Sangamo Amperehour Meters is discussed in an 8-page catalog now being issued by Lasalco, Inc., 2822-38 LaSalle St., St. Louis, Missouri.

---

18. Strip Heaters
Strip heaters for air heater and clamp-on heater applications are discussed in a catalog now being issued by General Electric Co., Schenectady, New York.

---

19. Polymerin-100
A catalog describing Polymerin-100, an industrial finish with exceptionally low-temperature speed baking characteristics, is now being issued by Ault & Wiborg Corporation, 75 Varick St., New York City.

Print plainly in filling out coupon for literature.

PRODUCTS FINISHING
431 Main St., Cincinnati, Ohio

I am interested in receiving the following literature reviewed in your July issue.

No...... **No.**..... **No.**..... **No.**..... **No.**.....
(Insert numbers denoting literature you want.)

Name ..... Title.....

Company .....

Company Address .....

City ..... State.....

Index TO ADVERTISEMENTS

Abrasive Company 69
Aluminum Finishing Corp. 64
American Abrasive Company 73
American Chemical Paint Co. 71
Atlantic Weka Corp. 74
Barium Hotel 76
Barton Mines Corporation 67
Carborundum Company, The 4
Dellinger Manufacturing Co. 65
Despatch Oven Company 33
Detroit Rex Products Co. ..... Fourth Cover
De Vilbiss Company, The 5
DeWitt Hotels, Inc. 75
Durham Manufacturing Co. 77
Egyptian Lacquer Mfg. Co. 6
Ford Sales Company, The J. B. 11
Glidden Company, The 3
Hamilton Emery & Corundum Co. 68
Hammond Machinery Builders, Inc. 57
Heatbath Corporation 13
Hovey Spray Equipment Co. 77
Industrial Advertising Conference 49
International Conveyor & Washer Corp. 55
International Nickel Company, Inc. 8
Jackson Buff Corporation 40-41
Juergens Co., Wm. A. 59
Keystone Emery Mills 70
King, John 66
Kirk & Blum Mfg. Co., The 27
Magnus Chemical Company 45
Mahon Company, The R. C. 21
Michigan Chrome Company 23
Motor Repair & Mfg. Co. 77
National Metal Exposition 31
Norton Company 2
Oakite Products, Inc. 1
Packer Machine Co., The 63
Parker Rust Proof Company 17
Philadelphia Quartz Company 43
Ransohoff Inc., N. 37
Ross Engineering Corp., J. O. ..... Third Cover
Roxalin Flexible Lacquer Co., Inc. ..... Second Cover
Rusticide Products Company 72
Scientific Control Laboratories 77
Solvents Recovery Service Inc. 70
Udylite Corporation, The 19
United Chromium, Inc. 35
Varnish Products Co., The 61

PRODUCTS FINISHING

PUBLISHED BY GARDNER PUBLICATIONS, INC.

431 MAIN STREET • CINCINNATI • OHIO